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UNIVERSITY OF TORONTO

REPORT OF THE DEAN

OF THE

FACULTY OF MEDICINE

Session 1962-1963

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THE DEAN OF THE FACULTY OF MEDICINE

The most important event of the past year was the announcement by the Government of Ontario that some form of universal health insurance would be introduced in the near future. Such a measure will have far-reaching effects on the medical school. This was appreciated by the Minister of Health, who invited representatives from each of the Faculties of Medicine of Ontario to join a committee appointed to advise him in preparation of the legislation. As the success of any health scheme must depend on the quality and numbers of physicians together with many different categories of health personnel, the preservation and protection of the universities responsible for their training is essential. Just how this is to be achieved has not yet been worked out.

In so far as the education of physicians is concerned, health insurance means a radical change in approach to undergraduate and graduate teaching. For generations the patient who has been the subject of teaching has not paid for his medical care. At one time he was the indigent, but latterly has been the patient admitted to that part of the hospital where according to the by-laws of the hospital medical fees may not be charged. These areas include the standard wards and the Outpatient and Emergency Departments. Such patients are not under the care of a private physician, but accept the professional services of the medical staff of the hospital. The medical staff is organized into a hierarchy, with graded responsibility stemming from the chief of service down to the student, the junior member of the team who is responsible for the initial history and physical examination. He is supervised by the interne, who is responsible to the resident, with the staff physician checking on the diagnosis and giving approval to the therapy recommended. By permitting them to participate and share in the diagnosis and therapy from the beginning of a patient's illness, students and internes learn how to accept responsibility and its consequences.

Health insurance based upon a fee for professional service rendered entitles every patient to the services of a private physician, and thus can deprive the medical school of its teaching patients. We do not believe this will happen because of the high standard of medical care obtaining in teaching hospitals. None the less we cannot depend on reputation alone to attract teaching patients, particularly when the day comes that hospital beds are in more plentiful supply than they are today. We must also endeavour to give the service and amenities the private patient expects and gets. This means that the Outpatient Departments must be operated more in the manner of a doctor's office, with visits by appointment and in comparable surroundings. These changes have been effected in clinics of some of the teaching hospitals but not in all. The cost of rebuilding such facilities is high and support of them expensive, and such expenditures are not covered by the Ontario Hospital Services Commission. The reconditioning of hospital wards to provide accommodation comparable to that available to the semi-private patient has been underway for some time in all teaching hospitals. Whether changes of this kind, along with the excellence of professional care offered, will continue to attract the class of patients we now have for teaching remains to be seen, but our expectation is that they will.

It is also probable that those patients who in the past have always had their own physician and private accommodation in the hospital will have to be included in the teaching unit which is defined as a designated number of beds in a hospital, together with ancillary services, where medical care is the responsibility of a medical team (students, internes, residents and staff physicians), and no patient is under the medical care of a private physician. To achieve this will require education of the public, and an assurance of income to the physician who is a member of the teaching unit.

At the present time the great majority of the physicians in the clinical departments of the University engaged in teaching undergraduates and graduates are paid

an honorarium of $250 per annum. For their livelihood they are dependent on private practice. In return for giving up to half their time to the University, they have an appointment to a teaching hospital that gives them access to a limited number of beds for their private patients. They are at present at a disadvantage vis-à-vis their confrères who hold hospital appointments in non-teaching hospitals.

While it is possible that the fees from insured patients in the teaching unit will become available to the medical teachers, and can be used to recompense the part-time physician for his share of medical care in the teaching units, the primary concern of all the clinicians on the staff of the University today is how to preserve the teaching unit as it is now constituted, to ensure the continued availability of patients for teaching.

While all the members of the clinical staff may share in giving supervision to medical care of patients, the individual contribution will vary widely. At one extreme is the full-time investigator, practising only in the hospital and seeing few patients, and at the other the physician spending most of his day in the wards. Both will teach, but again the contribution will vary. There are, then, three functions encompassed by the University-appointed clinician—teaching, research and patient care—and professional fees should only be used to pay for medical care. Other sources must provide for payment of teaching and research. At present research funds are obtained from granting bodies, and the University pays for teaching. The amount available to the University for this purpose is, however, inadequate. If the University is to continue to exert the control it must over the functions of its staff, then much more money must be found for the support not only of teaching, but also of research.

The curriculum study under Dr. Oille is continuing. During the past year he has participated in several conferences on teaching in Great Britain and the United States, and visited several medical schools where new curricula have been put into effect. Discussions with the Faculty about the premedical course have continued, and it is anticipated that some alterations may be introduced that will bring it into closer conformity with the General Course in Science. It is becoming apparent that radical changes will not be made in either the premedical or the professional courses. Modifications will be directed towards maintaining a broad preparation in science and the humanities, yet permitting those students not wishing to proceed into medicine to transfer to the Faculty of Arts and Science. At the present time transfer is possible, but the courses open to them are very limited. Changes of this nature are desirable, as too many students are trapped in the premedical course, having entered it before they have a clear idea of medicine and their aptitude for it.

In the professional course, the desirable changes relate to the integration of courses in different disciplines to a certain extent, horizontally in both basic medical and clinical science, and vertically between basic and clinical science. The problem of how to obtain integration in the mind of the student remains the most difficult of solution. Dr. Oille's report will be presented within the next few months, but the implementation of changes in the curriculum will be slow, and can only be achieved after much discussion and with the full support of the Faculty.

In the autumn of 1962, 175 students were admitted to the first professional year, with the object of increasing the number of graduates before 1970, when a shortage of physicians will exist in Ontario unless the medical schools can graduate more. The University of Toronto has the only medical school in Ontario capable of significant expansion, and yet an increase of 25 students per year over the 150 normally admitted is all the Faculty considers possible at present, without overcrowding and sacrifice of standards.

In the first premedical year, applications increased, and approximately 70 students with Grade 13 averages of 65 per cent and over were refused admission. This is not satisfactory, and a decision will have to be made about the number of students who take the premedical course prior to the first professional year, and the number admitted directly to the professional course with degrees from this and other universities.

The question of admissions to the professional course is further complicated by the re-establishment of a new course in the Faculty of Arts and Science, in Biological and Medical Sciences. Approximately 40 students completing their first year in this course have indicated they wish to proceed into medicine, and will enter the second medical year in 1966, at the same time as students admitted to the first premedical year in 1963.

The problem of drop-outs during the premedical course and first two years of the professional course continues to be of major concern. The implications are that methods of selection need revision, and probably that a better system of student counselling should be sought.

The course in Medical Jurisprudence that was so well organized by Professor Gray, with the assistance of the Justices of Ontario, is now under the direction of Dean C. A. Wright of the Faculty of Law, with the assistance of Professor Gray.

The Committee on Experimental Research has now been reorganized as the Committee on Animal Care. Professor Gornall has accepted the chairmanship, and will also act as Administrative Consultant to the Director, Dr. H. Baer.

The number of publications and papers presented to learned societies continues to increase despite the critical shortage of space for research. It is gratifying to report at this time that the Board of Governors has appointed a committee to look into the future development of the Faculty of Medicine and to make recommendations. During the past year, the Vice-President (Administration), Mr. Stone, and the Presidential Advisory Committee on Accommodation and Facilities have been helpful in trying to find ways and means of easing the present difficult situation. It is anticipated that the committee of the Board of Governors will produce recommendations that will ultimately solve our problems.

It is a pleasure to report the affiliation of the New Mount Sinai Hospital as a teaching hospital in Medicine and Pathology. The addition of a teaching unit in Medicine provides beds and Outpatient services that are much needed. Already the enthusiasm of the staff for teaching and the excellent facilities have won the commendation of the final year students.

Lyndhurst Lodge, a hospital for paraplegics, has also become affiliated. Under the direction of Dr. Jousse, this hospital has been used for instructing students in Physical and Occupational Therapy, and a small number of students in medicine, for some years. It is gratifying that recognition of the excellence of the facilities offered by this hospital and its contribution to teaching have been achieved.

An Institute of Biomedical Electronics under the direction of Professor N. F. Moody came into being during the year. This is a very significant step forward which arose because of the increasing dependence of medical research on the application of engineering principles to the measurement of biological function. From the view point of engineering science, biological function presents problems in research from which new principles may be established. Within a few months of assuming his new duties, Professor Moody was deeply involved in a wide variety of investigations in several departments of the Faculty. We are looking forward to exciting developments from the Institute, which represents the first official marriage of engineering and medicine in Canada.

The Medical Alumni Association again entertained the graduating class the evening before Convocation, and also had as guests the classes of 1903 and 1913. On this occasion, in recognition of the 40th anniversary of the discovery of insulin, the guests included Lady Banting and Drs. C. H. Best, J. B. Collip, Walter Campbell and A. A. Fletcher. In honour of their part in this discovery of insulin, Drs. Best, Collip, Campbell and Fletcher were made honorary life members of the Medical Alumni Association.

The President of the graduating class, Mr. Stanley Cassin, presented the Dean with a pair of white gloves, in recognition of the fact that every member of the class successfully passed the final examinations.

At the Convocation of June 12th, Dr. A. B. Stokes, Professor of Psychiatry and

Head of the Department, gave the address. One hundred and forty-six medical students graduated. Diplomas were awarded to 19 students in Public Health, 4 in Industrial Health, 8 in Medical Radiology, 27 in Psychiatry. At the Convocation of May 27th, diplomas in Physical and Occupational Therapy were awarded to 76 students, and in Speech Pathology and Audiology to 5 students. Degrees in Bachelor of Science (Medicine) were awarded to 2 students on June 12th.

Staff

Dr. R. Gunton of the Department of Medicine was appointed Professor and Head of the Department of Therapeutics. A graduate of the University of Western Ontario, Dr. Gunton has been a distinguished investigator in Cardiology and a member of the staff of the Cardiovascular Unit of the Toronto General Hospital. He assumed his new duties on January 1st.

Professor Leeson of the Department of Anatomy has resigned to accept an appointment as Professor and Head of the Department of Anatomy at the University of Alberta. A member of the staff for some years, he has made major contributions to research in electron microscopy and has been co-author with Professor Ham of *A Textbook of Histology.*

Professor Anderson, also of the Department of Anatomy, has resigned to accept an appointment as head of the Division of Physical Anthropology of the Department of Anatomy at the University of Buffalo. An outstanding teacher in both the Department of Anatomy and the Department of Anthropology, he has published a book on physical anthropology, and has another in preparation.

I wish to acknowledge at this time the contribution of the Voluntary Assistants of the teaching hospitals. These physicians give freely of their time to the Outpatient Clinics, where their assistance in teaching final year students is of great value, and is much appreciated by both the staff and the students. The Voluntary Assistants total 103 in number, and hold appointments in the Toronto General, St. Michael's, Toronto Western, the Wellesley, the Women's College and the New Mount Sinai Hospitals.

Two members of staff have been granted leave of absence to accept appointments on the teaching staff of the University of Lagos Medical School. Dr. Shirley Fleming is Professor and Head of the Department of Anaesthesia there, and Dr. T. Frederick Nicholson, Professor and Head of the Department of Pathology. Although they had accepted these appointments for one year only, both Professors Fleming and Nicholson have agreed to remain a second year. The Dean of Medicine of the University of Lagos, Professor H. O. Thomas, has written of the valuable contribution Doctors Fleming and Nicholson are making to the development of this new medical school in Nigeria.

A number of members of staff have retired this session, including Dr. R. M. Price from the Department of Bacteriology; Dr. E. H. Shannon from the Department of Radiology; Dr. F. C. Hamilton and Dr. H. Hethrington from the Department of Medicine; Dr. M. Spooner from the Department of Surgery; Dr. R. H. Meredith from the Department of Anaesthesia and Dr. G. H. W. Lucas from the Department of Pharmacology. The contribution of each of these members of staff has been over a period of many years, in teaching undergraduates and graduates, and in research. In grateful appreciation for their years of service of a high order to the University, it is a pleasure on behalf of the Faculty to wish them many years of health and happiness.

I regret to record the deaths of four members of staff: Dr. Wm. R. Mitchell, an Associate in the Department of Psychiatry; Dr. T. H. Hodgson, Associate in the Department of Ophthalmology; Dr. Angus A. Campbell, Emeritus Professor of Oto-Laryngology; and Dr. Wallace Graham, Associate Professor in the Department of Medicine. A pioneer in the field of rheumatology, Dr. Graham established an international reputation in research and developed the Rheumatology Unit of this University into an outstanding organization in research, in therapy

and in training young men. He will be remembered for these accomplishments and especially for his warm and sympathetic personality.

Honours

Dr. I. M. Hilliard was elected President of the Canadian Cardiovascular Society. Dr. J. W. Graham was President of the Academy of Medicine, Toronto. Dr. R. M. Taylor was appointed Chairman of the Committee on Cancer Control of the International Union Against Cancer. Dr. J. L. Silversides was elected President of the Canadian Neurological Society. Dr. D. M. Whitelaw was invited to spend three months in Thailand as a consultant in cancer chemotherapy. Dr. J. F. Mustard was elected to membership in the American Society of Clinical Investigation. Professor D. E. Cannell served as first Vice-President of the American College of Obstetricians and Gynecologists for 1961–62. Dr. J. R. McArthur was appointed an examiner of the Royal College of Obstetricians and Gynaecologists of London, England, the first Canadian to be so honoured. Miss Nancy Joy was appointed chairman of the Committee to nominate candidates for election to the Board of Governors of the Association of Medical Illustrators.

Dr. J. S. Crawford was Chairman of the Panel on Visual Problems, Defence Research Board of Canada. Dr. R. G. C. Kelly was elected President of the Seventh Pan-American Congress of Ophthalmology. Dr. H. M. Macrae was President of the Canadian Ophthalmological Society. Dr. A. E. MacDonald is on the International Council of Ophthalmology. Dr. P. E. Ireland was President of the Canadian Otolaryngological Society. Dr. Page Statton was appointed to the World Committee of Speech and Hearing. Dr. J. A. Sullivan was President of the American Otological Society and was elected Honorary Fellow of the Canadian Otolaryngological Society and Honorary Fellow of the Royal Society of Medicine of London, England. Dr. Blair Fearon was elected to the Council of the American Broncho-esophagological Association. Dr. Alex. Fee was elected an affiliate of the Royal Society of Medicine, London, England; Dr. D. P. Bryce was elected a Fellow of the American Laryngological Association. Dr. A. T. Jousse was granted fellowship in Physical Medicine and Rehabilitation by the Royal College of Physicians and Surgeons of Canada. Miss Helen LeVesconte was appointed Chairman of the Educational Committee of the World Federation of Occupational Therapy; Mrs. Thelma Cardwell has been re-appointed Honorary Secretary-Treasurer of the World Federation of Occupational Therapy. Dr. C. M. Godfrey addressed the Israel Cancer Association in Tel Aviv and the National Society of Physical Medicine and Rehabilitation of Switzerland.

Professor T. Frederick Nicholson, on leave of absence, was appointed Professor of Pathology and Head of the Department in the new medical school at Lagos, Nigeria. Dr. W. L. Donohue was elected a Fellow of the Royal College of Physicians of Canada (honoris causa). Dr. H. Z. Movat was Visiting Lecturer at the University of Tübingen. Dr. J. W. Steiner was Assistant Visiting Professor of Experimental Pathology at the University of Pittsburgh. Dr. M. I. Tom was elected President of the Canadian Association of Neuropathologists. Professor E. A. Sellers was appointed a member of the Special Committee on New Drugs of the Royal College of Physicians and Surgeons of Canada, and is Chairman of the Standing Committee on Drug Safety of the Pharmacological Society of Canada. Professor G. H. W. Lucas was appointed a member at large on the Executive Board of the Committee on Alcohol and Drugs of the National Safety Council of the United States. Professor W. Kalow is a member of an Inter-study Section Group of the United States National Institutes of Health. He has been elected President of the Pharmacological Society of Canada, and of the Toronto Biochemical and Biophysical Society.

Dr. C. B. Farrar received the degree of Doctor of Laws (honoris causa) from the University of Toronto. Dr. K. G. Gray was appointed chairman of the committee on Psychiatry and the Law, American Psychiatric Association. Dr. M. V. Jackson was appointed an advisory fellow on the Council of the World Federation of Occupational Therapists. Dr. J. W. Lovett Doust was Visiting Lecturer at the University

of South Carolina. Dr. A. Miller was elected President of the Ontario Psychiatric Association. Dr. A. Parkin was elected President of the Canadian Psychoanalytic Society.

Dr. R. A. Lobb was elected Vice-President of the Canadian Association of Radiologists. Dr. H. E. Meema received a "Certificate of Merit" for a scientific paper presented at the Association. Dr. A. C. Singleton was elected President of the Tenth International Congress of Radiology and the International Society of Radiology. He was awarded the Gold Medal of the American College of Radiology, the Gold Medal of the Radiological Society of North America, and was made an Honorary Member of the Sociedad Colombiana de Radiología. Dr. H. S. Coulthard was elected President of the Ontario Thoracic Society, Dr. Burns Plewes, President of the Academy of Medicine; and Dr. D. C. Robertson, President of the Canadian Society of Plastic Surgeons. Dr. D. J. Currie was awarded the Lancet Trophy for 1962 of the Royal Photographic Society (with A. Smialowski). Dr. R. O. Heimbecker was elected to associate membership in the American Association for Thoracic Surgery; Dr. W. K. Lougheed, a member of the American Academy of Neurological Surgeons; and Dr. W. K. Lindsay was elected to the American Society of University Plastic Surgeons.

Research

The lists of publications from the various departments give a good picture of the increasing volume and productivity of research in the Faculty of Medicine. In addition, the academic staff have again been much in demand to present papers at national and international meetings, to local societies and to other universities.

During the year, generous donations for the support of research have been received from many individual donors. I should like to mention in particular Mr. Percy Gardiner, who raised a large sum of money to assist with the equipping of the new laboratories for the Blood and Vascular Research Unit of the Department of Medicine. This is located at 86 Queen's Park, formerly the residence of the President and subsequently used by the Department of Art and Archaeology. This space was made available through the efforts of the Vice-President, Mr. Stone; and with the diligent co-operation of Mr. Hastie and his staff, extensive remodelling of the house was undertaken to provide first-class laboratory space for an outstanding research group.

A generous contribution from Mr. E. C. Fox made possible an investigation into deafness in children caused by the measles virus. With this support, Dr. Rhodes and his collaborators succeeded in isolating the virus. Professor Ireland and his collaborators are attacking another aspect of the problem—how to establish methods of testing infants and young children with regard to their hearing.

The renewal of a grant from the Dominion Stores is enabling the Department of Obstetrics and Gynaecology to continue its investigative programme.

It is again a pleasure to record the co-operation of the voluntary granting bodies in the aid of research. We are deeply indebted to the Atkinson Charitable Foundation, the J. P. Bickell Foundation, the National and Ontario Heart Foundations, the Canadian Arthritis and Rheumatism Society, the National Cancer Institute, the Canadian and Ontario Cancer Societies, the McLaughlin Foundation, the Markle Foundation and the National Institutes of Health of the United States. It is noteworthy that in each of the past three years, the candidate nominated by the University of Toronto has been awarded a Markle Scholarship. The support of the Medical Research Council, the Province of Ontario, the Department of National Health and Welfare and the Defence Research Board continues to be of major importance to the prosecution of research in this Faculty.

Visitors

The Faculty of Medicine has had the pleasure of visits from many scientists from abroad including, from the Middlesex Hospital, Sir Brian Windeyer, Professor

Campbell Golding and Mr. J. R. Hudson; Dr. Erik Linner, Dr. Hans Kottmeier and Dr. Gosta Dohlman from Sweden; Drs. J. D. Payne and P. W. McCormick from the Postgraduate Medical School, Hammersmith; Professor Thomas Nicol from King's College Medical School of London; Dr. A. S. McFarlane from the National Institute for Medical Research in Mill Hill; Sir Russell Brain, Drs. R. Barry Jones and E. S. Perkins from London; Professor H. L. McLaren from Birmingham; Dr. R. M. Marquis of Edinburgh; Professor T. N. A. Jeffcoate from Liverpool; Professor J. Stallworthy from Oxford and Sir Harold Himsworth, Dr. Magnus Haines, Dr. Eric Bywaters and Professor E. Zaimis from London; Professor Raoul Kourilsky from the University of Paris; Professor G. Crock from Brisbane; Dr. G. Meyer-Schwickerath from Essen; Professor G. C. Tandan from the All India Institute of Medical Sciences and Dr. Jorgen Clausen from the University of Copenhagen; Professor C. Crafoord of Stockholm and Professor C. Dubost of Paris.

Dr. Wallace Duncan of Cleveland, an alumnus of this medical school who over a period of years has given exceedingly generous support to the Orthopaedic Division of the Toronto General Hospital, participated in the official opening of the renovated orthopaedic teaching ward of that hospital.

The Walter Wright Lecture was given by Professor A. E. Maumenee, Head of the Department of Ophthalmology in Johns Hopkins University. The Harry Shields Lecture was given by Dr. John Severinghaus of the University of California, and the Balfour Lecture by Professor Francis D. Moore from Harvard University. The Phi Delta Epsilon Lecture was given by Dr. Joseph Sternberg of the University of Montreal.

I am deeply indebted to the secretarial staff for their assistance, and to the Faculty Council and the President for their co-operation and support throughout the year.

JOHN HAMILTON

DIVISION OF POSTGRADUATE MEDICAL EDUCATION

Under the direction of Professor R. Ian Macdonald

The work of the Division has continued to expand in response to the increasing need for short postgraduate courses and for full-time graduate training programmes in the various branches of medicine. This reflects the interests of the profession in the special phases of medical education; and the increasing attention being directed to them by organized medicine and by different special societies, both lay and medical, emphasizes the desirability of the university medical schools continuing with plans to organize their teaching assets in the best possible manner to meet the needs of graduate and postgraduate students without impairing their traditional responsibilities for undergraduate education and research. During 1962–63, 1,441 were registered with the Division. Four hundred and fifty were graduate students working and studying full time in different clinical and basic science departments. Of these, 114 were enrolled in Diploma Courses, 3 were proceeding to the B.Sc. (Med.) degree, 63 registered in sessional courses, and 243 were internes, residents, or fellows taking full-time training under direction of members of the Faculty of Medicine. Nine hundred and twenty-one doctors in active practice attended one or more of the nineteen special refresher courses designed particularly to meet their needs. Included in this group were ninety-eight doctors working full or part time in public health and for whom a special course was planned and given by the faculty of the School of Hygiene with the collaboration of this Division. An important contribution of the Faculty during the year was the advanced graduate courses given over a six weeks' period to a group of men and women who had either completed their training recently or who were returning for an advanced refresher course. These courses were offered

in Medicine, Surgery, and Obstetrics and Gynaecology and seventy graduate students were registered.

The amount of faculty teaching time devoted to graduate and postgraduate students was very considerable and it imposed heavy burdens on the departments concerned and particularly those with a heavy load of undergraduate teaching and with extensive research projects. However, the effort seems to have been well worth while and it is becoming generally recognized among the profession that the Faculty of this School is doing its full share in helping graduates to complete their training and in providing means for men in active practice to keep up to date. A major teaching effort, for which no figures of attendance could become available, was in the decentralized clinic programme. This brought twenty-seven teams of university teachers to ten centres in Ontario. Each clinic involved careful planning and collaboration between this Faculty and the local medical societies and the objective has been to enable doctors in practice to take an active part in postgraduate programmes in their own areas.

During the year the Director of the Division served as a member of the Education Committee of the Ontario Medical Association and continued to co-operate closely both with that Committee, with the Secretariat of the Ontario Medical Association, and with different medical societies in Ontario.

DIVISION OF REHABILITATION MEDICINE

Under the direction of Dr. A. T. Jousse

The continuing requirements of this division are the provision of instruction in physical medicine and rehabilitation and in allied fields, and the conducting of research to make possible improved patient care.

The following received instruction during 1962–63:

GRADUATE	
Physiatrists	6
Speech Pathology and Audiology	11
Post graduate course in Physical Therapy (Teacher Training course)	4
UNDERGRADUATE	
Medicine	
Third year	133
Fourth year	146
Physical and Occupational Therapy	300

At the May Convocation, five received diplomas in Speech Pathology and Audiology, two diplomas as teachers of Physiotherapy, and eighty-three diplomas in Physical and Occupational Therapy.

The physician who elects to specialize in physical medicine and rehabilitation becomes the key person in the operation of rehabilitation programmes in the community. Where such trained persons are in practice, excellent rehabilitation services are provided. It is thus our first responsibility to carry on a continuing programme of training in this specialty. The need for speech pathologists is not being met by the combined training in Canada, in addition to the service rendered by those trained abroad. This means, of course, that more facilities for the training of this specialized type of person are required. The work of the physiatrist is dependent largely on the availability of physical and occupational therapists. As the present schools are operating at, or nearly at, capacity, the need for more teachers to permit the opening of more schools is evident. Hence the continuing emphasis on the teachers' training programme.

It is true that to a great extent the expansion of rehabilitation services across Canada has been made possible through the training programme for physiatrists which has been operating in Toronto since World War II and that the opening of

new schools of physical and occupational therapy was made possible by the teachers' training programmes. The teaching of undergraduates in medicine is slowly changing the attitude of the younger practitioners who are now aware of the need for long-term restorative programmes of patient care for the physically disabled. A considerable number are assuming responsibility for this type of care in their own practices.

Postgraduate courses were offered during the term in Speech Pathology and Audiology and in Physical Therapy through the Division of Postgraduate Medical Education.

The continued financial support from the Department of Health of Ontario has made possible further research in the field of prosthetics, orthetics, speech pathology and audiology, and in clinical medical practice. Improved teaching will result.

Mrs. Wilma Brown, who has been a valued member of our staff for a few short years, will assume a full-time position with the Department of Anatomy at the end of this term. However, we believe that our undergraduates will continue to enjoy the benefits of Mrs. Brown's great teaching. We wish her every success in her new appointment.

Miss Hazel Lloyd, a qualified teacher of physical therapy from Britain, will assume the responsibilities previously borne by Mrs. Brown.

Two additional staff members are being added in an effort to deal with the increased numbers of students. Miss Helen Ostoff brings great clinical experience in occupational therapy from her post at the Hospital for Sick Children. Mrs. Margaret Gacich, a new physical therapy teacher, is a graduate of this year from the teachers' training course.

This year, for the first time, the number of first-year students is being restricted to 110. Our facilities do not allow of a greater number being enrolled.

The members of the medical staff in the Division have contributed time and effort to the dissemination of the rehabilitation concept. Nurses have been instructed by lecture and clinical demonstrations. Doctors Crawford, Godfrey, and Geisler and the Director have spoken to medical groups in Toronto and environs. Also, Dr. Godfrey has lectured in Moscow, Geneva, and Israel during the past year.

Research

Dr. John Crawford and his associates at the Toronto Western Hospital, are continuing their studies of the lower extremity amputee and the dysphasic component present in many hemiplegics. A new study has been undertaken by Dr. Wm. Franks on the influence of hypothermia on the spasticity of skeletal muscle in persons suffering from multiple sclerosis.

Some success has been achieved by the prosthetist and a practical brace for the lower extremities has been developed and is being used for the early mobilization of the patient with a fractured surgical neck of the femur.

A careful study has been carried out by Miss Elizabeth Bond and Miss Jean Ward on the incidence of speech defects in school children in selected Toronto schools. The project is a long-term one and is likely to reveal for the first time the need for speech therapy in the schools.

Publications

Godfrey, C. M. *et al.* "Treatment of Post-Mastectomy Lymphoedema" (*Journal of Canadian Physiotherapy Association,* vol. 14, no. 4, Dec., 1962, pp. 211–5).

Godfrey, C. M. and Bagshaw, M. "Speech Therapy for the Laryngectomized Patient" (*Canadian Medical Association Journal,* vol. 87, no. 18, Nov. 3, 1962, pp. 976–7).

Godfrey, C. M. and Ward, J. F. "A Two-year Postgraduate Course in a Faculty of Medicine" (*ASHA,* vol. 4, no. 12, Dec. 1962, pp. 444–5).

——— "Common Speech Problems Encountered in General Practice" (*Canadian Medical Association Journal,* vol. 87, no. 23, Dec. 8, 1962, pp. 1236–9).

Geisler, W. O. and Jousse, A. T. "Rehabilitation in Disseminated Sclerosis: An Evaluation of Twenty-eight Patients" (*Canadian Medical Association Journal,* vol. 88, no. 4, Jan. 26, 1963, pp. 189–91).
Jousse, A. T. "The Evolution of the Treatment Programme for Paraplegics in Canada" (*Journal of the Association for Physical and Mental Rehabilitation,* vol. 16, no. 5, Sept.-Oct. 1962).

MEDICAL SOCIETY

(September 1962 to June 1963)

Honorary President	Dean John D. Hamilton
Honorary Secretary-Treasurer	Dr. MacAllister Johnston
Chairman	Dr. D. D. H. Mackenzie
President	R. Galway
Vice-President	W. Crysdale
Treasurer	J. Graham
Secretary	J. Fisher

The 1962–63 session brought with it several problems for the Medical Undergraduate Society, but these were offset by an equal or greater number of successful programmes. A few of the year's highlights were the achievement of financial stability, the establishment of a greater faculty spirit and identity on campus, and the social successes of the At-Home, and the Staff-Student Smoker.

The Medical Society Assembly, some twenty-five members, held bi-weekly meetings throughout the year under the leadership of Dr. Don Mackenzie and his ever handy (and ever necessary) Robert's *Rules of Order.* An element of parliamentary procedure was thus introduced into Medical Society meetings

The major problem confronting the Assembly was financial. Outstanding accounts for both the *Journal* and the *Probe* had to be paid, but through a policy of strict budgetary supervision and an appropriation from Duncan Room profits, the financial commitments were met and a small balance remained. It became quite evident that the Medical Society fee collected from each student was and would continue to be inadequate for the present-day requirements of the Society. Therefore, at the final 1963 meeting of the Society, a motion was passed apportioning 50 per cent of the Duncan Room profits to the budget of the incoming Society. It is hoped that this will go a little way toward establishing a firmer financial foundation for future societies.

This year a concerted effort was made by the members of the Assembly to interest the medical students in the varied activities going on in other parts of the campus. This was done by re-establishing the *Probe* as a Faculty newsletter, by obtaining a special Hart House and SAC Bulletin Board, and by several special events designed to introduce the campus to the ingenuity of the medical mind. It was gratifying to see the selection of several students from this Faculty for the Finnish exchange programme, the W.U.S. Seminar in Pakistan, and the S.A.C. Inter-University Exchange Visits. As well, the Faculty has achieved a proportionate representation on the various campus societies. However, greater participation is still to be hoped for in extra-faculty events.

The social functions of the year were most successful. The Fall Banquet at Hart House provided a formal reception to those entering Premedicine; the dance in the Drill Hall afterwards gave a more informal introduction to university life. The Fall Dance held at the Piccadilly Club, though a social success, was a financial failure. The Medical At-Home, once again held at the Royal York Hotel, was the best in years. Bill Crysdale and his committee of class presidents worked industriously and were rewarded by a large attendance and compliments from all those present.

In spite of the financial difficulties which the *Journal* encountered at the beginning of the year, James Graham and his editorial assistants created one of the

most stimulating series of the *Medical Journal* in recent years. The articles on student research, haematology, and psychiatry were of special interest. The other student publication, the *Probe*, overcame its financial problems and the co-editors, Stan Barron and Jerry Shime, published a most intriguing year-end literary issue. Throughout the year considerable discussion about the role of the *Probe* took place at Society meetings. It was felt that it could perhaps best serve the needs of the Faculty in the form of a newsletter. It was recognized, however, that the literary aspect offered a stimulus to some of the creative minds among the undergraduates. Therefore it was decided that a newsletter be published under the title of the *Probe*, and further that an editoral staff be established to publish a *Probe Yearbook*. This policy is to be initiated in 1963–64.

Daffydil was again original but a qualified success. The highlights of the show were the choreography and the chorus.

The Arts and Letters Society was particularly active under Chairman Bob Annis. Several modern art exhibits in the Duncan Room enlivened lunchroom conversation; one of the major activities this group organized was the noon-hour debates.

A word about the Staff-Student Committee is deserved. Under the capable leadership of George McQuibban, this group successfully co-ordinated several projects, their suggestions to the curriculum revision committee being of greatest importance. The Staff-Student Smoker, held at Malloney's, was most successful and most informative. A further project which this committee arranged was the fireside chat with Mr. Freamo of the C.M.A. He introduced us to the many complex problems behind medicare.

Several important constitutional amendments were introduced during the year. The first of these was a motion "that any undergraduate entering 1st, 2nd, 3rd, or 4th year Meds be eligible for nomination to the S.A.C.; further that any member of the Faculty of Medicine elected to the S.A.C. might stand for nomination to the S.A.C. in subsequent years; and further, that the S.A.C. elections be held at an earlier date than the Medical Society elections." A further constitutional amendment of some importance was the establishment of a seat on the Assembly for the Blue and White Society representative.

The criteria for the Honour Awards were established. These awards are given to graduating students at the time of their final year banquet. The selections are made on the basis of continued and diversified activity in undergraduate medical affairs, such activity being contributory and directive as well as participant in nature, and tending to further the organization and advancement of medical undergraduate affairs as a whole. The recipients of the awards this year were: David Appert, Susan Atack, Stanley Cassin, Robert Galway, James Graham, Inara Grava, John Hall, Walter James, Peter Koplin, George McQuibban, and Kathleen Moses.

There are several other activities of the Society that deserve mention. W.U.S., N.F.C.U.S., C.A.M.S.I., and S.A.C. representatives all played important parts during the year. The initiation of an employment-opportunity questionnaire set down the framework for future achievements in this area.

The Medical Alumni Association plays an important role in the life of many medical students. That the alumni are keenly interested in the undergraduates is exemplified by the support given to the students in the form of bursaries, scholarships, and loans, and by the functions sponsored by the alumni—for example, the General Practice Panel and the Graduation Banquet.

The year ended with a most successful banquet at the Tiroler House where the frustrations of the year were washed away in true Tirolean fashion.

In closing this report, I wish to thank Dean Hamilton for his tremendous support to the Assembly over the year and also for the Hart House Banquet, held during the Christmas season.

My sincere thanks go to all members of the Medical Assembly for the support given to me during the year. I would like to make special mention of John Graham,

who filled the most demanding role of Treasurer, of Jan Fisher, who replaced a previous full-time secretary in a most capable fashion, and of Dr. Don Mackenzie who was so helpful as Chairman. While it is not possible to name all the other people who have contributed to the undergraduate life of the Faculty, their efforts have been truly appreciated. I ask them to lend their support to the new president, Bill Dixon, to whom I extend best wishes.

ROBERT GALWAY

MEDICAL ATHLETIC ASSOCIATION

(September 1962 to June 1963)

Honorary President	Dr. J. E. Hall
Honorary Secretary-Treasurer	Nobby Wirkowski
President	J. W. James
Vice-President	W. Cawkell
Secretary-Treasurer	E. Sholdra
Publicity director	G. S. Watkin
Quartermaster	R. Repo
YEAR REPRESENTATIVES	
IV Medical Year	R. Sloan
III Medical Year	E. Henry
II Medical Year	R. McGee
I Medical Year	I. Sinclair
II Premedical Year	G. Barber
I Premedical Year	B. Taylor

The Medical Athletic Association completed its most successful season in twenty years. Not since 1943 when the Faculty won the Reed Trophy has there been such participation and achievement in athletics. This new interest can be partially credited to the M.A.A. executive, but, for the most part, it is due to a new type of medical student who continues his interest in athletics established at high school, and takes increasing advantage of the sports programme provided by the University.

The athletic programme began well, with a strong football team of 34 players coached by our vice-president, Willie Cawkell. The team was considered the finest Meds has produced for fourteen years, and it reached the quarter-finals. Rugger, a new sport on campus, was popular among medical students; two teams reached the semi-finals and one team was a finalist, but was edged out by Victoria. The volleyball championship saw two Meds teams battle in the finals for the championship which was won by second-year Medicine. Waterpolo, a very popular sport in our faculty, had four representative teams undefeated in the play-offs with the third-year Medicine winning the championship of the University. The Meds "A" hockey team boasted a strong unit built up over the past few years. The team was good from the goal to the forward lines. It entered the semi-finals, and the losses sustained there may easily be attributable to the time of year of these playoffs and also to the time of day of the games. There were three Meds teams in all with 50 players participating. Lacrosse was represented with four teams, although there were no serious contenders from the Faculty. As well as the two major league teams, each class fielded one or two minor basketball teams. Over 600 athletes participated in all the sports.

The annual autumn golf tournament was held at Forest Hill Golf Course and 75 golfers competed for the trophy, which was won by Clare Williams of the fourth year.

The annual awards banquet was held March 21, 1963, with Dr. John E. Hall and Mr. Nobby Wirkowski giving the main addresses. Attended by approximately one hundred athletes of the Faculty, the banquet was a fitting finale to a year of such athletic enthusiasm and achievement. The Athletic Stick, symbolic of highest

athletic contribution and participation, was awarded to J. Walter James. The executive keys were awarded to Raimo Repo, George Watkin, and J. Walter James, with the special awards being given to Ian Sinclair, John Graham, J. Walter James, Jim Brooks, George Watkin, and Larry Langlois. Ian Sinclair of the First Medical Year received the Boeschenstein Award. Thirty-two athletes received First Colour Awards.

With such increased interest in athletics on the part of the Faculty, the M.A.A. began to make changes in the society. A five-year plan for the purchase of equipment was begun so that every team will have enough new and used equipment at the beginning of each season to successfully field as many teams as there are athletes. Similarly, changes in the length of office of the executive members have been initiated so that there will be a gradual transition year by year and thus ensure a capable and experienced executive. Owing to the capable management of the athletic equipment by Raimo Repo and the team managers, the cost of equipment has been kept within the necessary limits.

In the past year intramural coaches, intercollegiate managers, and directors of athletics in Hart House have been led to remark that Medicine has the best team and faculty spirit of any division in the University. With the calibre and enthusiasm of the medical athletes and the guidance of a very capable, sincere executive we may hope to win the Reed Trophy and many more individual championships next year. I wish President Willie Cawkell and his executive the greatest success in the activities of the coming year.

J. Walter James

MEDICAL WOMEN'S UNDERGRADUATE ASSOCIATION

(September 1962 to June 1963)

Honorary President	Dr. Mary Atack
President	Kathleen Moses
Vice-President	Beverley Ellis
S.A.C. Representative	Susan Atack
Treasurer	Ann Haag
Social Convener	Sandra Geikie
I Premedical Representative	Elizabeth Ross

This year a record number of women were admitted to the Faculty, and they were officially welcomed by the Association at a tea held in their honour at the home of Dr. Atack in late September. This provided an opportunity for the initiating members to meet some of the fourth-year medical girls and become acquainted with the activities of this Association as well as those of the Medical Society.

The Initiation Banquet was held in October at Peppio's Restaurant. This proved successful with at least one hundred persons present, among whom were several graduate women doctors. Dr. William Oille was our guest speaker and he was very stimulating and provocative with his comparison of medicine as practised at the turn of the century with that practised today.

The Duncan Room again was the site chosen for the Christmas party. About fifty girls attended, the traditional gifts for the children of the University Settlement House were collected, and the annual "open meeting," with Dr. Atack presiding, concluded the party. The Federation of Medical Women of Canada provided various functions for the undergraduates. In early November a tea was held in Burton Hall and one of the highlights of the afternoon was a tour of Women's College Hospital. Towards the end of the academic year, a dinner in honour of the girls in the graduating class was held and was well attended.

The Medical Alumni Association changed their programme slightly this year and, instead of the usual panel discussion, they sponsored an informal get-together with Doctor H. Banting providing a very entertaining and informative talk on her

travels and experiences in the Philippines and the Far East. About four of the more recent graduates who are pursuing postgraduate courses in Dermatology, Anaesthesiology, and Research were present to answer any questions pertaining to their particular fields. This event proved very successful and may be repeated in future years.

The last function held was the farewell party given by the girls of the third medical year for the graduates who were presented with the traditional gifts of silver teaspoons.

The common room was repainted, and a few pieces of furniture added. In view of the increasing number of girls in the Faculty, it is becoming more difficult to accommodate everyone there, especially during the lunch hour.

Our Honorary President, Dr. Mary Atack, was very helpful in providing counselling and guidance throughout the year, and this was greatly appreciated.

As an organization the M.W.U.A. continues to fulfil its purpose of integrating the undergraduates, as well as acquainting them with graduates.

My sincere thanks are extended to the executive members for their co-operation and efficiency. To my successor, Linda Geiger, and her executive, I wish every success.

KATHLEEN MOSES

MEDICAL WOMEN'S UNDERGRADUATE ATHLETIC ASSOCIATION

(September 1962 to June 1963)

President	Inara A. Grava
Vice-President	Ann Griffin
Treasurer	Joan Dixon
Secretary	Mary Robertson

During the 1962–63 season, the women of the Faculty of Medicine participated in the following intramural sports: basketball, volleyball, hockey, badminton, archery, swimming, and skiing. No championships were won. A badminton tournament was held in February. New equipment was purchased for the hockey team.

The athletic season ended on March 19 with our annual athletic banquet, held at the Nanking restaurant. The guest speaker, Dr. J. E. Hastings of the School of Hygiene, related some of his experiences while on a tour of the world, under the sponsorship of W.H.O. Awards made at the banquet included one Premedical Bar, six Medical "M's," and the following University of Toronto awards: two Third Colours, three Junior "T's," and one Silver "T."

I should like to thank this year's executive for their support, and to wish next year's executive every success.

INARA A. GRAVA.

SCIENCE AND MEDICINE DEPARTMENT UNIVERSITY LIBRARY

Reported by Mrs. M. Galt

In the last year the department has made many changes. Perhaps the most impressive is the new Current Periodicals Reading Room which is located in the very pleasant South Reading Room of the Library. The other major change is an alphabetical arrangement of the biological and medical serials by title. This move involved approximately 2,200 titles and should greatly facilitate the use of bound journals in the stacks.

A five-year survey of the collection has been made by a representative from each medical department, in accordance with the policy of the Library Committee of the Faculty. The books recommended have been ordered and should soon be available. The interest and co-operation of the teaching and research staff have been invaluable in making the medical collection one of the best in Canada.

The Book Delivery Service has grown rapidly. The figures for science and medicine books and journals indicate more and more of the staff are taking advantage of it. Last year 5,116 books were delivered and 6,332 returned.

A collection of recent texts selected from the medical duplicates was sent to the Eastern Medical Centre, Enugu, Nigeria.

Two librarians attended the Second International Congress on Medical Librarianship, held in Washington in June. This meeting was attended by 1,200 medical librarians from all parts of the world.

REPORT ON REGISTRATION, SESSION 1963–64

First Premedical Year	124
Second Premedical Year	121
First Medical Year	161
Second Medical Year	166
Third Medical Year	129
Fourth Medical Year	133
Special Students	4
Art as Applied to Medicine	2
Bachelor of Science (Medicine)	1
B.Sc. (Med.) Summer Session	13
(also registered in medical undergraduate years)	
Diploma in Medical Radiology	19
Diploma in Psychiatry	41
Diploma in Public Health	24
Diploma in Industrial Health	1
Diploma in Anaesthesia	22
Graduate students	310
Physical and Occupational Therapy	295
Speech Pathology and Audiology	17
Student Teachers	4
	1587

FELLOWSHIPS, SCHOLARSHIPS, MEDALS, AND PRIZES

Awarded at Convocation, June, 1963

Graduate

Graham Campbell Prize	Y. Nito, M.D., Ph.D.
Canadian National Institute for the Blind Fellowships	I. O. Drysdale, M.D. (Dal.). C. J. Radford, M.D.
W. P. Caven Memorial Fellowships	C. T. Chou, B.Sc., M.D., M.Sc. P. R. Sweeny, B.Sc., M.Sc., Ph.D.
Elizabeth Arbuthnot Dyson Fellowship	Miss K. A. Fullerton, B.S. (Sask.), M.D.
William Goldie Prize	P. M. O'Sullivan, M.D., F.R.C.P. (C)
Roscoe Reid Graham Travelling Fellowship in Surgery	W. H. Kerr, M.D.
Stuart Alan Hoffman Memorial Prize	Miss M. DeWolfe, B.Sc. (Acadia), M.A.
Arch Hutchison Fellowship	R. Volpé, M.D., F.R.C.P. (C)
Frances Esther Hutchison Fellowship	D. E. Wood, M.D.
Interlake Research Award	M. G. Williams, M.D. (Man.), M.R.C.P. (Edin.)
Lister Prize	R. E. Outerbridge, M.D., F.A.C.S., F.R.C.S. (C)
Minister of Health Gold Medal	G. Shugar, M.D.

Starr Medals	J. K. Davidson, B.S., M.D. (Emory) H. Schachter, B.A., M.D. A. J. Becker, M.D.
John Alexander Stewart Fellowship	T. W. Fox, B.A., M.D., F.R.C.P. (C) C. Alter, M.D., F.R.C.P. (C)
Helen L. Vanderveer Fellowship	H. C. Palter, M.D.

UNDERGRADUATE

Fourth Medical Year

Cody Gold Medal	M. Zweig
Cody Silver Medal	R. Baumal
Cody Silver Medal	P. D. Sadowski
Dr. Benjamin W. Appleton Prize in Psychiatry	Miss M. J. Ashley, Miss I. A. Grava } *Aeq.*
Butterworth Prize	J. H. Renouf
J. P. Boley Prize in Ophthalmology	Miss M. J. Ashley
Chappell Prize in Clinical Surgery	Miss B. J. Craig
Dr. Jacob Goldstein Scholarship	J. R. Taylor
Hendry Memorial Scholarship	H. J. Lackner
Issei Scholarship in Medicine and Surgery	Miss M. J. Ashley
Dr. Louis Kagan Memorial Award	Miss M. J. Ashley
Medal of the Consul General of France	D. R. Henderson
Medical Alumni Association Scholarship	P. D. Sadowski
Medical Alumni Association Prize	Mrs. C. M. P. Townsend
Ellen Mickle Fellowship	M. Zweig
Ontario Medical Association Prize in Preventive Medicine	Miss M. J. Ashley
Dr. Roy Simpson Scholarship in Paediatrics	P. D. Sadowski
Starkman Memorial Scholarship in Medicine	H. J. Lackner

Third Medical Year

Franckel Memorial Award	W. J. Weiser
Charles E. Frosst Scholarship	F. W. Furlong
J. F. Hartz Company Prize in Ophthalmology	J. Y. Wakil
J. F. Hartz Company Prize in Oto-Laryngology	P. L. Pitt
Frank W. Horner Gold Medal in Paediatrics	R. U. Repo, W. T. Trathen } *Aeq.*
Samuel Rotman Scholarship	W. J. Weiser
Starkman Memorial Prize in Pharmacology and Therapeutics	M. A. Singer
Starkman Memorial Prize in Public Health and Preventive Medicine	H. Tanzer
Walter F. Watkins Scholarship	H. Tanzer

Second Medical Year

Dr. F. J. Colling Memorial Scholarship	R. P. Orange
John Copp Bursary	J. A. Israel
Dr. Thomas Arnold McCormick Scholarship	J. E. Schuman
Plaza Drug Store Scholarship	F. Simon
Posluns Brothers Scholarship	F. Simon
Sandoz Prize in Pharmacology	K. H. Shumak
Walter F. Watkins Scholarship	L. E. Cappe

First Medical Year

Starkman Memorial Scholarship in Anatomy	K. W. Johnston
Dr. C. S. Wainwright Memorial Scholarship	K. W. Johnston
Walter F. Watkins Scholarship	M. J. Sole
John Zoberman Scholarship	Miss S. M. Perz

Second Premedical Year

Famous Players Canadian Corporation Scholarship	N. N. Iscove
Fulford Scholarship (No. 4 General Hospital)	G. L. Weisbrod

First Premedical Year

Dr. and Mrs. M. A. Pollock Award	P. F. Halloran

ANAESTHESIA

Under the direction of Professor R. A. Gordon

The content of the course of lectures given by the Department to the third-year students continues to be of concern. Once again emphasis was placed on subjects of interest to the general physician such as maintenance of the airway and ventilation, oxygen therapy, the treatment of respiratory deficiency, care and transportation of the unconscious patient, and cardiac resuscitation. Each of the students in the third medical year attended the tonsil clinic at the Hospital for Sick Children on two afternoons for demonstration of ether anaesthesia. Students in the fourth year of the undergraduate course received training in clinical anaesthesia for a period of one week during their surgical term, and twelve clinics in anaesthesia.

There were 36 postgraduate students in the Department during the year. Of these, 21 were registered in the diploma course, and 15 as sessional students. Foreign postgraduate students have come from the British Isles, Hong Kong, India, Thailand, Italy, and the Philippines. Postgraduate teaching in the Department continues to be carried on in tutorial groups, with the addition of lectures on special topics.

The Department gave three one-week refresher courses during the session. Two of these were designed for general practitioners with a special interest and experience in anaesthesia, and the third for qualified specialists. These were attended by a total of 69 physicians. Members of the Department have lectured to postgraduate courses in other departments within the Faculty and to the course in Hospital Administration in the School of Hygiene.

The fourth Dr. Harry Shields lecture was given on September 28, 1962, by Dr. John Severinghaus, Director of Anesthesia Research in the Cardiovascular Research Institute of the University of California School of Medicine. Dr. Severinghaus' subject was "Current Research in Respiratory Physiology." A successful reunion of former postgraduate students in the Department was held on the same day.

The Department has been pleased to welcome the following visitors during the year: Professor G. C. Tandan, All-India Institute of Medical Sciences, New Delhi, India; Dr. J. D. Payne and Dr. P. W. McCormick of the Department of Anaesthesia of the Postgraduate Medical School, Hammersmith, London, England; Dr. Arthur M. Torrie of Seattle, Washington; Professor Gordon Wyant, University of Saskatchewan; Professor Wolfgang Spoerel, University of Western Ontario; Professor H. B. Graves, University of British Columbia.

Professor Rice Meredith retires at the end of this session after 30 years of valuable service as a teacher in the department, the last 8 as Anaesthetist-in-Chief of the Toronto Western Hospital. He will be greatly missed. He will be succeeded as Anaesthetist-in-Chief at the Toronto Western Hospital by Dr. H. W. Boyes. The Department is pleased to welcome Dr. J. E. York as a Clinical Teacher, and Dr. Mary E. Hunter and Dr. Murray Mendelson as Voluntary Assistants.

Dr. Shirley Fleming has spent the year at the University of Lagos Medical School in Nigeria as Professor and Head of the Department of Anaesthesia. Dr. Fleming has been responsible for the organization of both the teaching in anaesthesia in this new medical school, and the clinical service in the University Hospital and other associated hospitals in Lagos. Dr. Fleming returned to Toronto for three months on June 22, and Dr. T. R. Hanley of this Department went to Lagos to take her place for that period.

Professor R. A. Gordon visited Great Britain in October and November, 1962, where he represented the Department at the celebration of the twenty-fifth anniversary of the founding of the Nuffield Department of Anaesthetics at Oxford University, and was guest lecturer at the Glasgow and West of Scotland Society of Anaesthetists, the Department of Anaesthesia of Edinburgh University, and the Postgraduate Medical School, Hammersmith. He also attended the annual scientific

meeting of the Association of Anaesthetists of Great Britain and Ireland. Professor Gordon was elected President of the Canadian Anaesthetists' Society in May, 1963, and has served as editor of the *Canadian Anaesthetists' Society Journal.*

Professor A. W. Conn represented the department at a testimonial dinner for Professor Harold Griffith at McGill University to mark the twentieth anniversary of the first use of curare in anaesthesia by Dr. Griffith.

Dr. H. B. Fairley was elected Honorary Member of the New England Society of Anesthesiologists.

During the year the following lectures and addresses were given outside the University by members of the Department. Dr. Zonko Bak: "Treatment of Low Back Pain by Epidural Injection of Cortico-Steroids," Academy of Medicine, Toronto. Dr. A. W. Conn: "What is Safe Anaesthesia?"—Lakehead Medical Society; "Anaesthesia for Spinal Fusion in Children," Canadian Anaesthetists' Society. Dr. H. B. Fairley: "The Critical Evaluation of Acid-Base Balance Studies," and "Hospital Facilities for the Management of Acute Cardio-Respiratory Failure," New England Society of Anesthesiologists; "Problems in the Management of Respiratory Insufficiency; Hamilton Academy of Medicine; "The Management of Respiratory Insufficiency," Western New York Society of Anesthesiologists; Brantford Medical Society; "The Evaluation of New Mechanical Respirators," Atlantic Provinces Division, Canadian Anaesthetists' Society; "Intensive Care Techniques, with Special Reference to the Use of Respirators," Peterborough Medical Society; "Work of Breathing in Anaesthesia—A Preliminary Report," Canadian Anaesthetists' Society; "Treatment of Respiratory Deficiency," Canadian Medical Association, General Session. Dr. Shashi B. Goel: "Intrathecal Phenol in the Treatment of Intractable Pain of Malignant Disease," Canadian Anaesthetists' Society. Dr. R. A. Gordon: "The Post-operative Recovery Room," Glasgow and West of Scotland Society of Anaesthetists; Special lecture at Edinburgh University and Postgraduate Medical School, Hammersmith; "The Use of Intrathecal Phenol in the Treatment of Intractable Pain," Western Division, Canadian Anaesthetists' Society; "An Evaluation of Stellate Ganglion Block in the Treatment of Post-Traumatic Dystrophic Disturbances of the Upper Extremity," Canadian Anaesthetists' Society. Dr. James H. Kerr: "Anaesthetic Technique for Tracheal Resection," Canadian Anaesthetists' Society; "Neonatal Asphyxia and Modern Concepts of Resuscitation of the Newborn," Canadian Medical Association. Dr. Code Smith: "Flouthane Anaesthesia," Windsor Medical Society. Dr. J. S. Whalen: "Anaesthesia for Hare Lip and Cleft Palate," Academy of Medicine, Toronto; lecture to Canadian Anaesthetists' Society.

Research

Dr. H. B. Fairley with the assistance of Dr. Douglas Hunter has investigated work of breathing in anaesthesia. This study is now being expanded to include patients with respiratory difficulty. The same workers have studied the design of non-return respiratory valves and have been able to make progress in the design of a special electronically controlled valve for use in the study of physiological dead space; they have also conducted assessments in the laboratory and the operating room of the performance of new mechanical ventilators and certain new anaesthetic equipment. Dr. Fairley has been assisted in this work by grants from the Connaught Trust Endowment Fund and from the Medical Research Council.

In the laboratory Dr. James Kerr has studied methods of anaesthesia for resection of the trachea, in association with Dr. Pearson of the Department of Surgery, working under a grant from the Ontario Cancer Treatment and Research Foundation. Under a grant from the Medical Research Council, Dr. Kerr has also continued his studies of respiratory resistance in pregnancy and the influence of epidural spinal anaesthesia on respiratory resistance, and has instituted a study on

the influence of cigarette smoking on intrinsic respiratory resistance. These studies continue.

Dr. Shashi Goel has undertaken studies to evaluate methods for the measurement of pain threshold. It has been reaffirmed that direct measurements involving the registration of subjective response are unreliable. In association with Dr. Kerr, Dr. Goel is investigating the usefulness of recording changes in respiratory flow pattern as a response to threshold pain. Under the direction of Professor Gordon, Dr. Goel has also conducted an investigation of the clinical use of intrathecal phenol for the relief of intractable pain in malignant disease, has reviewed the records of patients with post-traumatic dystrophic disturbances of the hand treated over the past 15 years by stellate ganglion block, and has, in collaboration with Dr. A. M. Rappaport of the Department of Physiology, investigated the influence of respiratory factors and anaesthesia on hepatic blood flow. Dr. Goel was supported by grants from Burroughs Wellcome Company (Canada) and Ayerst, McKenna and Harrison, while study on measurement of pain threshold was supported in part by a grant-in-aid from the Medical Research Council.

Dr. Iain M. MacKay has been associated with Col. Norman McNally of the Canadian Forces Medical Service in the development of new portable anaesthetic equipment for use by the armed services and by the Emergency Health Services Division of the Department of National Health and Welfare.

Dr. Zonko Bak, in collaboration with Dr. John Evans of the Department of Surgery at St. Michael's Hospital, has undertaken a clinical study of the treatment of certain types of low back pain by the epidural injection of cortico-steroids.

Dr. William Young has spent the year at the Postgraduate Medical School at Hammersmith on an R. S. McLaughlin Fellowship and has been associated with Dr. Keith Sykes in a study of factors involved in the post-perfusion oxygen desaturation seen in patients who have undergone open-heart surgery with the use of the pump oxygenator. Dr. Young will join the anaesthetic staff of St. Michael's Hospital on July 1, 1963.

Publications

Conn, A. W. "Anaesthesia for Pyloromyotomy in Infancy" (*Canadian Anaesthetists' Society Journal*, vol. 10, no. 1, Jan. 1963, pp. 18–29).

Fairley, H. B. "Drugs in Respiratory Emergencies" (*Applied Therapeutics*, vol. 5, no. 4, April, 1963, pp. 322–5).

——— "Respiratory Insufficiency" (*International Anesthesiology Clinics*, vol. 1, no. 2, Feb., 1963, pp. 351–439).

Gordon, R. A. (ed.) *International Anesthesiology Clinics*, vol. 1, no. 2, Feb., 1963.

——— "The Postanaesthetic Recovery Room" (*Canadian Anaesthetists' Society Journal*, vol. 10, no. 2, March, 1963, pp. 140–7).

——— "Special Problems in Anesthesia for Pulmonary Resection" (*International Anesthesiology Clinics*, vol. 1, no. 2, Feb., 1963, pp. 515–26).

Gordon, R. A. and Shields, H. J. "Liquid Anesthetics;" in *Anesthesiology*, by D. E. Hale, 2nd ed., pp. 267–305. Philadelphia: F. A. Davis. 1963.

Kerr, J. H. "An Analysis of Ventilatory Volumes in Pregnancy" (*Canadian Anaesthetists' Society Journal*, vol. 10, no. 2, March, 1963, pp. 137–9).

Rogoman, E. R., Johnston, A. E. and Conn, A. W. "The Use of Epinephrine during Halothane Anaesthesia with Respect to Ventricular Irritability in Dogs" (*Anesthesia and Analgesia, Current Researches*, vol. 42, no. 1, Jan.-Feb., 1963, pp. 109–16).

ANATOMY

Under the direction of Professor J. W. A. Duckworth

During the year 1962–63 there were 1,761 undergraduate and graduate students working in the Department of Anatomy. They were distributed among the 34 different courses mentioned below, as follows:

UNDERGRADUATE COURSES IN ANATOMY

1.	Medical, First year	175	
	Art as Applied to Medicine	4	
	Physical & Occupational Therapy, Teachers' Course	2	
	Graduate Students in Anatomy	3	
2.	Medical, Second year	142	
3.	Dental, First year	123	
4.	Dental Hygiene, First year	49	
5.	Physical Anthropology, First premedical year	80	
6.	Physical Anthropology, Honours 3C	18	
7.	Physical & Occupational Therapy, First year	138	
8.	Physical & Occupational Therapy, Second year	84	
9.	Physical & Occupational Therapy, Third year	78	
10.	Physical & Health Education, Second year	40	
11.	Physical & Health Education, Third year	58	
12.	Speech Pathology & Audiology	6	
13.	School of Embalming, First year	71	
14.	School of Embalming, Second year	45	
			1,116

GRADUATE COURSES IN ANATOMY

15.	Radiology (Diploma course)	9	
16.	Anaesthesia (Diploma course)	16	
17.	Neuro-Anatomy	25	
18.	Obstetrics & Gynaecology (Advanced graduate course)	18	
19.	Ophthalmology	5	
20.	Otolaryngology	13	
21.	Dental Anatomy	9	
22.	Physical Anthropology 1001	6	
23.	Physical Anthropology 1002	2	
24.	Demonstrators' Course in Gross Anatomy	7	
25.	Advanced Graduate Course in Surgery	26	
26.	Advanced Anatomy of the Locomotor System	12	
27.	Anatomy 5	1	
28.	Anatomy 6	5	
			154

UNDERGRADUATE COURSES IN MICROSCOPIC ANATOMY

29.	Medical, First year (included in item 1)	175	
30.	Dental, First year (included in item 3)	123	
31.	Physical & Occupational Therapy, First year (included in item 7)	138	
			436

GRADUATE COURSES IN MICROSCOPIC ANATOMY

32.	Graduate Dental Histology	7	
33.	Graduate Histology	10	
			17

EXTENSION COURSE

34.	Canadian Surgical Trade Association—Technicians	38	
			38
	TOTAL		1,761

During the 1962–63 session the total enrolment in the Department increased by 377, and the total staff teaching hours by 348 to a grand total of 6,290 teaching hours.

The Gross Anatomy course was revised this year to include two hours per week of anatomical drawing. In this class, the students were shown how to construct an anatomical drawing and were required to prepare approximately seventy specially selected skeletal and regional drawings. The object of this course was to emphasize the importance of each student acquiring a visual image of the anatomy

of the human body and also to show him that an accurately constructed anatomical drawing will give him a great deal of anatomical knowledge which otherwise could be obtained only by memorizing many pages of prose.

In November, 1962, Professor Thomas Nicol, Dean of King's College Medical School, University of London, gave two lectures on his researches into the relationship between the reticulo-endothelial system and the defence mechanisms of the body.

The Department is losing three members of the staff this year. Professor T. S. Leeson leaves to become head of the Department of Anatomy in the University of Alberta, in succession to Professor H. E. Rawlinson. Professor J. E. Anderson leaves to become head of the Physical Anthropology Division of the Department of Anthropology in New York State University, Buffalo. Professor J. S. McGrail leaves to take up an appointment in the Department of Otolaryngology at Ann Arbor University, Michigan.

During the year, the following papers were presented. Dr. J. E. Anderson: "Genetic Variations in the Skeleton," annual meeting of the American Association of Physical Anthropologists; "Regional Anatomy of Head and Neck," invitation lecture to the annual meeting of the Canadian Dental Association. Dr. M. C. Hall: "Alterations in Bone in Early Osteoporosis," Canadian Federation of Biological Societies; "Anatomy of Osteoporotic Bone," annual meeting of the Canadian Orthopaedic Association. Dr. T. S. Leeson: "The Fine Structure of the Rat Rete Testis," Fifth International Congress for Electron Microscopy; "The Trabecular Meshwork of Normal and Glaucomatous Eyes," by invitation to the Faculty of Medicine, University of Alberta; "The Fine Structure of Blood/Air Barriers," by invitation, the Dr. William Potter Lectureship, at the University of North Dakota; "The Fine Structure of the Chorio-Allantois of the Chick" (joint paper with Dr. C. R. Leeson), annual meeting of the American Association of Anatomists; "The Fine Structure of Developing Mammalian Lung" (joint paper with Dr. C. R. Leeson), annual meeting of the Canadian Federation of Biological Societies. Dr. J. S. McGrail: "A Study of Histamine Skin Test Reactions," Ear, Nose and Throat Division of the University Medical Center, Ann Arbor, Michigan.

Research

Dr. J. E. Anderson, in conjunction with Dr. K. O. McCuaig, has continued his long-term study of the growth pattern of normal Canadian adolescent children at Trinity College, Port Hope. In conjunction with Mr. Richard Austin, he carried out an anthropological examination of the skeletons of an historic Onondaga population from a burial site near Syracuse, New York. Supported by the National Museum of Canada, he is also working on an extensive monograph on the genetic and biological affinities of Canadian Indian populations.

Dr. S. H. Bensley, with the aid of a research grant from the Banting Research Foundation, has continued her studies on the microscopic and histochemical changes in connective tissue due to chronic inflammation and repeated intraperitoneal injections of colchicine in albino mice. Some of the vascular, cellular, and fluid changes were recorded by cinephotomicrography of the living transilluminated iris of the anaesthetized experimental animals. It was found that changes observed in the living iris reflected changes that occurred in other connective tissues in different parts of the body. In most instances injected colchicine produced anti-inflammatory reactions with an increase in mast cells, but these effects lasted for only about 2 days, after which the chronic inflammation increased. In the animals that came to autopsy, there was histological and histochemical evidence of an auto-immune reaction to a glycoprotein in the circulatory blood, probably derived from the abnormal ground substance of the connective tissue, which was not completely removed by mast cells or macrophages, or completely excreted by the kidney. Of the organs examined, the liver, spleen, kidney, and eventually the adrenal glands were involved in this immunity reaction. In addition, at autopsy, 50 per cent of

the animals were found to have tumours, most of which were of mesenchymal origin. Cytological studies were made of the pancreatic islets of Langerhans and of the non–insulin-secreting tumour tissue in cases of the Zollinger-Ellison syndrome. The pancreatic tumours contained cells which differed from both alpha and beta cells in their staining properties and inclusions. These abnormal cells were occasionally found in islets of the pancreatic tissue adjacent to the tumour.

In collaboration with Dr. John Birch of the Research Division of the Hospital for Sick Children, the fate of the collagenic fibres of unsutured, autologous flexor tendon grafts of the chicken was studied histochemically. It was found that at the cut ends of the graft where granulation gap tissue developed the collagenic fibres were lost and replaced by new fibre-forming tissue, but in the centre of the graft the collagenic fibres were only slightly modified and after revascularization of the graft, the original fibres were reconstituted.

Dr. M. C. Hall, in conjunction with Miss Margaret Rosser, has investigated the structure of the upper end of the humerus with reference to osteoporotic changes in senescence in relation to fractures. They found that the loss of bone in senescence occurred chiefly in the greater tuberosity and the upper end of the shaft just beneath the epiphyseal scar. Investigating the effects of immobilization on cartilage, the knees of young male rats were immobilized with wire loops passed around the femur and tibia. The knees were examined histologically after sacrificing the animals at intervals from 27 to 123 days. It was found that some flattening of the joint surface occurred so that the small areas of initial contact were enlarged. There was some increase in thickness of the articular cartilage at the point of contact through which an increased amount of weight per unit area was being transmitted. There was no degeneration at the point of contact, but degeneration of the articular cartilage occurred in the non-contact areas. Invasion of the periphery of the articular cartilage by the synovial membrane was found. Investigating by microradiography the pattern of bone formation in the upper femora of the hypophysectomized rat, he found that there was relatively a greater preponderance of periosteal and endosteal bone compared with the cartilage plate derived bone that is the dominant tissue in the control rat.

Dr. T. S. Leeson has studied the fine structures of the rete testis and related it to sperm transport, and has studied in detail the histochemistry and fine structure of the Meibomian glands in relation to cell breakdown and lipid formation.

With Dr. C. R. Leeson, he has undertaken several projects. Studies of the "blood/air" barriers in developing rat lung and in the chick chorio-allantoic membrane. Studies on the trabecular meshwork of the eye and its relation to glaucoma have continued in association with Dr. J. S. Speakman.

Publications

Anderson, J. E. *The Human Skeleton.* Ottawa: National Museum of Canada. 1962. Pp. 164.

——— "Osteology of the Donaldson Site"; in *The Donaldson Site,* by J. V. Wright and J. E. Anderson, pp. 95–113. Ottawa: National Museum of Canada. 1963.

——— *The People of Fairty.* Ottawa: National Museum of Canada. 1963.

——— "A Pre-Iroquois Burial Site" (*Ontario Archaeology,* Series B, no. 2, June, 1962, pp. 39–46).

Hall, M. C. "Cartilage Changes after Experimental Immobilization of the Knee Joint of the Young Rat" (*Journal of Bone and Joint Surgery,* vol. 45–A, no. 1, Jan., 1963, pp. 36–44).

——— "A Microradiographic Examination of the Pattern of Bone Formation in the Upper Femora of the Hypophysectomized Rat" (*Clinical Orthopaedics,* vol. 25, Sept., 1962, pp.171–4).

——— "The Velpeau Bandage" (*Canadian Medical Association Journal,* vol. 88, no. 2, Jan. 12, 1963, pp. 92–3).

Hall, M. C. *et al.* "The Structure of the Upper End of the Humerus with Reference to Osteoporotic Changes in Senescence Leading to Fractures" (*Canadian Medical Association Journal,* vol. 88, no. 6, Feb. 9, 1963, pp. 290–4).

LEESON, T. S. "Electron Microscopy of the Rete Testis of the Rat" (*Anatomical Record*, vol. 144, no. 1, Sept., 1962, pp. 57–67).
——— "The Fine Structure of the Rat Rete Testis"; in *Proceedings of the 5th International Congress for Electron Microscopy*, vol. 2–00–11. New York: Academic Press. 1962.
——— "Tarsal (Meibomian) Glands of the Rat" (*British Journal of Ophthalmology*, vol. 47, no. 4, April, 1963, pp. 222–31).
LEESON, T. S. (with L. Adamson) "The Mammalian Tunica Vaginalis Testis: Its Fine Structure and Function" (*Acta Anatomica*, vol. 51, no. 3, 1962, pp. 226–40).
LEESON, T. S.(with C. R. Leeson) "Electron Microscopic Study of the Postnatal Development of the Ductus Epididymis in the Rat" (*Anatomical Record*, vol. 145, no. 2, Feb., 1963, p. 334).
——— "The Fine Structure of the Rat Lung: A Developmental Study" (*Proceedings of the Canadian Federation of Biological Societies*, vol. 6, 1963, p. 36).
——— "Light and Electron Microscopic Observations on the Chick Chorio-Allantois" (*Anatomical Record*, vol. 145, no. 2, Feb., 1963, p. 253).
OWER, R. C. and DUCKWORTH, J. W. A. "Treatment for Facial Deformity in Lipodystrophia Progressiva" (*American Journal of Surgery*, vol. 104, no. 1, July, 1962, pp. 65–9).

ART AS APPLIED TO MEDICINE

Under the direction of Professor Nancy Joy

The Department of Art as Applied to Medicine has a dual purpose; first, to offer illustration services to members of the Faculty and secondly, to train students. Some of the students are trained as medical artists and others as technical illustrators who present statistical and scientific data in pictorial form.

This year the services of the Department have been used by eleven different departments of the Faculty of Medicine. Over thirty commissions for graphs have been completed, each consisting of from one to twenty or more pieces. About twenty requests for medical drawings or sets of drawing and a number of small displays have been prepared. A few graphs have also been prepared for the Department of Botany. This work has been used for teaching at the graduate and undergraduate level and for refresher courses, and also for publication of research, both in print and in the form of slides for medical meetings in Toronto and elsewhere.

During the busiest periods an extra medical artist and an extra graph and layout artist were employed and worked under the supervision of the staff of the Department of Art. The services of these artists were used chiefly for work supported by grants and for work requested by the Ontario Department of Public Health and by the Ontario Cancer Institute. Most of the work of these free-lance artists was paid for directly by those commissioning it.

The volume of work has increased spasmodically throughout the year being especially heavy in May and early June. The scope of the work is restricted by the lack of facilities with which to afford a number of art services that depend, in part, on photographic techniques or on T.V. The quantity of work requested would automatically increase if these services were offered. The building of permanent exhibit material also requires more facilities than are presently available, and so is seldom attempted.

The medical artists on the staff have given training and supervision in the preparation of graphs to a commercial lettering and layout artist who was employed by the Department of Art in August, 1962. The Department of Surgery arranged to have a technician on their staff receive similar instruction, on an apprenticeship basis, from the Department of Art. Supervision, equipment, and a place to work have been made available to seven or eight postgraduate students in the Faculty who wished to prepare graphs to present their own work.

The staff of the Department have supervised the work of three regular students in the course of Art as Applied to Medicine, one in second year and two in first, and have given them individual instruction in the application of art to medicine.

The Director of the Department and the staff have been very grateful throughout this year for the smooth and efficient organization of the Department which was established and developed by Miss Maria Wishart, who retired last year.

Nancy Joy was appointed chairman of the Committee for nominating candidates for election to the Board of Governors of the Association of Medical Illustrators in 1963.

Publications

Joy, Nancy. "Bibliography of Medical Illustration, of the Association of Medical Illustrators, for 1962: A Selection of Recent Additions" (*Association of Medical Illustrators Newsletter*, vol. 4, no. 1, Jan., 1963, pp. 7–10).

——— "Pictured Fact and Fancy in Current Medical Literature" (*Annals of Surgery*, vol. 156, no. 3, Sept., 1962, pp. 511–12).

BACTERIOLOGY

Under the direction of Professor Philip Greey

The undergraduate teaching has continued with minor modifications during the past year. Postgraduate instruction was given to the residents in Ophthalmology and Internal Medicine.

Dr. R. M. Price retires this June after nearly thirty years of active teaching. She is especially known for work on bovine tuberculosis in children and her research contributed to the passing of legislation in 1934 requiring that milk be pasteurized in Ontario. The regard that students have for her is indicated by this quotation from the *University of Toronto Medical Journal* (March, 1963): "Certainly we shall be sad when Dr. Price leaves this university. She is known and remembered by hundreds of students, and there is a feeling of great respect and admiration for this lady, who cared so much that we should be good practitioners of medicine and who spared no effort to help us in this respect. We wish her good fortune wherever she goes." So do we.

Research

Dr. R. M. Price has continued her interest in the prophylactic vaccination against tuberculosis and the study of atypical strains of acidfast bacilli isolated from human sources.

Dr. G. H. Hawks, at St. Michael's Hospital, is continuing to determine the sensitivity to penicillin of recently isolated strains of gonococci and the presence of auto-antibodies in thyroid disease using the tanned red cell technique.

Dr. Marion Ross, at Sunnybrook Hospital, has been testing the sterility of materials exposed to sterilizing doses of Cobalt 60. She is also investigating the value of anaerobic conditions for the primary isolation of *Streptococcus haemolyticus* from throat and sputum cultures.

Dr. T. E. Roy, at the Hospital for Sick Children, with Miss Anne Collins has continued studies on the transduction of antibiotic resistance with staphylococci. Bacteriophages derived from antibiotic-resistant staphylococci can transfer the resistance to sensitive strains. This has been shown to occur for resistance to the antibiotics tetracycline, chloramphenicol, and novobiocin. With Dr. P. C. Fleming work is in progress on cephalosporin C, an antibiotic effective in certain coliform infections, and on the distribution in various bacterial species of an enzyme, cephalosporinase, which destroys the antibacterial activity.

Miss Joan Hennessy, with Dr. W. B. Spaulding, Department of Medicine, has continued to collect specimens of lymph node pus from patients with cat scratch disease. Efforts to grow a virus from these specimens are being continued in tissue culture cells, including calf serum adapted HeLa cells, human embryo

lung, and freshly prepared chick embryo cells. Attempts to demonstrate interference of the cytopathogenic effect of known viruses, such as Coxsackie A9, in cell lines previously inoculated with passaged material from lymph node pus, have been negative in the cell lines used so far. The use of aluminum chloride in tissue culture media is being investigated in an effort to eliminate the PPLO or L-forms inherent in most lines of cells. Millipore filter cultures and a variety of media are being investigated for the growth of PPLO, using tissue culture cell lines as the primary source of the bacteria. In collaboration with Dr. W. T. W. Clarke and Dr. G. Pawlowski, Department of Medicine, a new antibiotic for the treatment of urinary tract infections is being studied. In collaboration with Dr. J. M. Finlay, Department of Medicine, bacteriological studies have continued on patients attending the gastro-enterological unit. Studies are in progress on patients undergoing transurethral prostatectomy with the Division of Urology, Toronto General Hospital.

Dr. A. E. Franklin has continued studies of the relationship between tissue culture cells continuously propagated in medium with prednisolone and their sensitivity to selected viruses. Previously it had been shown that viruses which propagated with difficulty in some cell systems could grow more easily in prednisolone-sensitized cultures. Recently, some experiments have been done to see if such hormone-treated cells were sensitive enough to be of use in a routine diagnostic laboratory. Smaller virus inocula and a lower concentration of prednisolone in growth and maintenance media have been studied. Preliminary evidence indicates that this method may be sensitive enough to attempt the use of clinical specimens. Cell lines under study include those of malignant origin such as KB, HeLa, Hep-2, and J-111, as well as cells derived from non-malignant tissues such as human amnion, human adult heart, monkey heart, and human embryonic lung. Viruses used in this study include poliovirus -1, Coxsackie A6, A7, A9, A16, Coxsackie B5, B6, ECHO-9, *Herpes simplex*, and specimens from cases of acute stage infectious hepatitis and serum hepatitis. All experiments with hepatitis specimens have been unsuccessful so far.

Dr. J. C. Sinclair and his associates, Miss B. K. Buchner, M.A., and Mrs. L. Shreeve, have continued research efforts in the hepatitis field. During the past year they have isolated five filtrable transmissible agents, cytopathic for certain culture cell lines, from cases of hepatitis occurring in Ontario in the period 1958 to 1962. Four of the isloations were first obtained in Davis' tissue culture cell line of human embryonic lung. Two of the agents (CB and ML) have been studied in detail, the other three to a lesser degree. The principal features of the two studied in detail were that they failed to produce cytopathic changes in primary cultures of monkey kidney and no illness followed the subcutaneous and intraperitoneal injection of less than 24-hour-old suckling mice. They proved to be thermostable in the presence of molar $MgCl_2$ and were capable of withstanding 60°C. for 30 minutes. With these two agents (CB and ML) no neutralization could be elicited with antisera specific for the presently known and classified enteroviruses. The unidentified isolates will shortly be injected into patas monkeys as part of a co-operative study presently being undertaken with Dr. Gerald Bearcroft of the West African Council for Medical Research at Yaba, Lagos, Nigeria.

Publications

Keddy, J. A. and Roy, T. E. "Hospital Infection: What we Found in a Children's Hospital" (*Canadian Hospital*, vol. 39, no. 10, Oct., 1962, pp. 100–12).

Roy, T. E. *et al.* "A Survey of Hospital Infections in a Pediatric Hospital: I, Description of Hospital, Organization of Survey, Population Studied and Some General Findings; II, The Distribution of Hospital Infections in Different Areas of the Hospital, Postoperative Wound Infections and the Consequences of Infection; III, Staphylococcal Infections, Notes on Antibiotic Sensitivity of the Staphylococci from Postoperative Wounds and Other Infections, Discussions and Summary" (*Canadian Medical Association Journal*, vol. 87, no. 10, Sept. 8, 1962, pp. 531–8; no. 11, Sept. 15, 1962, pp. 592–9; no. 12, Sept. 22, 1962, pp. 656–60).

BIOCHEMISTRY

Under the direction of Professor C. S. Hanes

During the past year 403 students have received instruction in the Department of Biochemistry, the distribution being as follows:

Faculty of Medicine (first medical year)			173
Faculty of Dentistry (first year)			121
Faculty of Arts, third year honour courses			30
fourth year honour courses			11
Graduates Enrolled as Special Students in Faculty of Arts & Science			6
School of Graduate Studies			62
(a) Major Subject Biochemistry		15	
Candidates for Ph.D.	10		
Candidates for D.Clin.Sci.	2		
Candidates for M.A.	3		
(b) From other departments		45	
(c) Special Students		2	
TOTAL			403

The Department has again collaborated in giving a course on clinical applications of radioactive isotopes in June under the aegis of the Division of Postgraduate Medical Education. A special section of this course was arranged also for a group of students proceeding to the B.Sc.(Med.) degree.

Members of the Department have contributed 12 lectures and papers at congresses, symposia, and other scientific gatherings during the year. In addition three members of the staff (Professors B. F. Crocker, G. H. Dixon, and G. R. Williams), with the help of the staff of the Canadian Broadcasting Corporation, prepared a sequence of three television programmes in the Live and Learn series, dealing with the nature and significance of biochemistry.

RESEARCH

Members of the Department have received generous grants-in-aid of research from the National Research Council of Canada, the Medical Research Council of Canada, the J. P. Bickell Foundation, and the Canadian National Institute for the Blind.

Professors G. E. Connell and G. H. Dixon have continued their investigations designed to clarify the nature of the genetic variations in the structure of human haptoglobins. A determination of the amino acid sequences in key parts of the haptoglobin molecule is in progress.

In Professor Connell's laboratory, Mr. Murray Freedman has been studying naturally occurring proteins of low molecular weight related to the γ-globulins. He has prepared several distinct substances of this category from human urine and is investigating their immunological and chemical relationships to normal γ-globulin. Dr. Ayse Ozge has initiated a study of the properties of anti-haemophilic factor and its action in blood coagulation. Progress has been made in developing assay systems and preparative methods for the factor. Professor Connell and Dr. Burgess, Faculty of Dentistry, have carried on an investigation by electrophoresis of salivary proteins with the object of identifying variations in the proteins of different individuals.

In Professor B. F. Crocker's laboratory, Dr. Albert Hercz has continued his study of the mechanism of the induced formation of galactosidase in *E. coli*. He has obtained experimental evidence that the external "inducer" is enzymically transformed before becoming active as actual inducer. He has been studying also the ribosome-bound enzyme in induced and non-induced cells.

In Professor G. H. Dixon's laboratory, Dr. H. Schachter has developed a general method for the identification of the site of methionine modified either by oxidation or by alkylation and, using this method, has established the position of the modified

methionines of α-chymotrypsin under various conditions. He has also discovered a new type of oxidative modification of chymotrypsin that occurs only in the presence of hydrogen peroxide and a specific substrate of chymotrypsin. Miss K. A. Halliday has begun work on methionine modification in trypsin and has shown that specific trypsin substrates also alter profoundly the rate of oxidation of the enzyme by hydrogen peroxide. Mr. P. Aston has continued his work on the chemical modification of insulin by the substitution of amino groups and has studied the re-synthesis of insulin from the separated A and B chains using A chain labelled with a radioactive marker. Dr. F. Eng has begun a purification of a specific glycyl peptidase from cabbage.

Professor J. Manery Fisher and Mrs. E. Dryden have continued their study of carbohydrate metabolism in frog tissues. Particular attention was paid to the low utilization of glucose by frog muscle compared with its capacity to metabolize lactate. In order to identify the compound which transports phosphorus into frog muscle cells, Mrs. C. Dunkley has used radioactive orthophosphate, radioautographs, and paper chromatographic techniques. By progressively decreasing the time of exposure of the muscle to radioactive phosphorus from 4 hours to 30 seconds, a characteristic sequence of labelled compounds was found. These are being identified by co-chromatography, chemical tests, and specific enzymes. A tentative hypothesis has been developed to explain the finding by Mr. I. W. French—that aldosterone exerts a homeostatic effect on tissue electrolytes *in vitro* of young adrenalectomized rats maintained on various salt diets. The hormone could not be shown to affect the ions of isolated mammalian muscle during incubation, probably because the isolated muscle became loaded with sodium, and this could not be prevented. Mr. Y. K. Matuk has completed his investigation of Na, K, and Cl transport in the isolated rabbit lens; he is developing methods for the study of adenosine-triphosphatase in lens membranes, since this enzyme is probably involved in cation transport. Dr. B. Hunt is currently developing semi-micro calcium and magnesium methods applicable to tissues.

In Professor C. S. Hanes' laboratory, Mr. J. T. Wong has continued to devote part of his time to studies on the kinetic theory applicable to enzymes which act on two substrates. The continued study by Mr. Ross Donovan of the breakdown of elastin under the action of pancreatic elastase has led to the recognition of new complexities characterizing the enzymic attack of an insoluble substrate. Dr. Rashid Anwar, a temporary guest worker, is seeking to identify the sequence of peptide linkages which are hydrolysed during the dissolution of elastin under the action of elastase.

In Professor R. K. Murray's laboratory, Mr. M. A. Maung is studying the structure of the carbohydrate moiety of rabbit haptoglobin. Studies are projected on the mechanism of biosynthesis of this glycoprotein. Mr. R. J. Miller is commencing studies on the metabolism of the "basic" proteins of rat liver in normal and pathological conditions. Professor Murray is continuing his own studies on the structure of the carbohydrate moiety of human haptoglobin. Also, in collaboration with Dr. H. Kalant, Department of Pharmacology, he has been studying the leakage of soluble proteins from slices of normal liver and of hepatomata. The studies on hepatomata have revealed that a fraction of "basic" proteins is missing from the tumours and the nature and significance of these proteins is now being investigated.

In Professor G. R. Williams' laboratory, Mrs. Jane Tsai is studying the carboxymethylation of cytochrome C. The haemoprotein loses its characteristic enzymic activities and its peculiar properties as a haemochromogen, concomitant to the uptake of about 2 carboxymethyl groups. Dr. J. T. Wong has been studying a group of reductases which appear in a single fraction upon chromatography of a detergent extract of sonically disrupted mitochondria. He is also attempting to decide whether liver alcohol dehydrogenase can catalyse an exchange of C^{14} between ethanol and acetaldehyde. Mr. K. Davis is carrying out a survey of the low molecular weight -SH and -S-S- compounds of rat liver mitochondria with a view to understanding their metabolic significance. Professor Williams is continuing his own studies of kinetics

of the Krebs' cycle and is collaborating with Dr. D. F. Parsons of the Department of Medical Biophysics in an attempt to determine the enzymic characteristics of the new entities recently discovered as part of the fine structure of mitochondrial cristae.

Three graduate students in the Department of Biochemistry completed their work for the Ph.D. degree and presented theses as follows: I. W. French, "The Effect of Aldosterone on cell electrolytes and metabolism"; Y. K. Matuk, "Metabolic Factors Influencing Lens Electrolytes"; J. Tze-Fei Wong, "Kinetic Criteria of Reaction Mechanisms in Enzymic Group-Transfer Systems."

Publications

Craston, A. R. and Manery, J. F. "Sodium, Potassium, Nitrogen, Phosphorus and Lipid in Muscle Mitochondria Isolated in Sucrose Media of Varying Concentrations" (*Canadian Journal of Biochemistry and Physiology,* vol. 41, no. 4, April, 1963, pp. 831–47).

Dixon, G. H., Schachter, H. and Halliday, K. A. "An Alteration in the Reactivity of Chymotrypsin and Trypsin towards H_2O_2 in the Presence of Specific Substrates" (*Proceedings of the Canadian Federation of Biological Societies,* vol. 6, 1963, p. 20).

Kalant, H. and Murray, R. K. "Effect of EDTA on Leakage of Proteins from Normal Rat Liver and DAB-hepatomata" (*Proceedings of the American Association for Cancer Research,* vol. 4, no. 1, 1963, p. 32).

Ma'tuk, Y. K. and Manery, J. F. "Metabolic Factors Influencing Lens Electrolytes" (*Proceedings of the Canadian Federation of Biological Societies,* vol. 6, 1963, p. 40).

Schachter, H. and Dixon, G. H. "A General Method for Identification of the Site of Methionine Modification and its Application of Chymotrypsin" (*Proceedings of the Canadian Federation of Biological Societies,* vol. 6, 1963, p. 54).

——— "Identification of the Methionine Involved in the Active Centre of Chymotrypsin" (*Biochemical and Biophysical Research Communications,* vol. 9, no. 2, 1962, pp. 132–7).

——— "Modification of the Methionines of α-chymotrypsin" (*Federation Proceedings,* vol. 22, no. 2, 1963, p. 245).

Shaw, R., Bozek, R. G. and Connell, G. E. "Electrophoresis of Saliva in Starch Gel" (*Journal of Dental Research,* vol. 41, no. 6, 1962, pp. 1322–6).

Smithies, O., Connell, G. E. and Dixon, G. H. "Chromosomal Rearrangements and the Evolution of Haptoglobin Genes" (*Nature,* vol. 196, no. 4851, 1962, pp. 232–6).

Williams, G. R. "The Reduction of Cytochrome *c* by Hydroquinone" (*Canadian Journal of Biochemistry and Physiology,* vol. 41, no. 1, Jan., 1963, pp. 231–7).

Wilson, S., Dixon, G. H. and Wardlaw, A. C. "Resynthesis of Cod Insulin from its Polypeptide Chains and the Preperation of Cod-ox 'Hybrid' Insulins" (*Biochimica & Biophysica Acta,* vol. 62, no. 3, Aug., 1962, pp. 483–9).

COMMITTEE ON EXPERIMENTAL RESEARCH

Reported by Dr. Harold Baer

Thirty-nine researchers used the facilities of the Committee on Experimental Research in 1962–63. Animals used were: dogs, cats, rabbits, guinea pigs, pigeons, hamsters, rats, mice, monkeys, and groundhogs. Of these, dogs, rabbits, and cats were the most numerous as purchased through the Committee. There were 688 dogs, 753 rabbits, and 180 cats purchased. Healthy cats were allowed to roam free in two rooms constructed and finished last summer. A total of 585 operations were performed in the animal operating rooms.

Diseases and parasitic conditions diagnosed were: (*a*) dogs—distemper, hepatitis, tracheobronchitis, bronchopneumonia, ecclampsia, and ecto- and endoparasites; (*b*) cats—feline panleucopenia, pneumonitis, ear mites, mange, mycotic infections, endoparasites, and gastro-enteritis; (*c*) rabbits—pasteurellosis, hepatic and intestinal coccidiosis; (*d*) guinea pigs—viral and bacterial pneumonias; (*e*) mice—tapeworms. The presence of these conditions points out the great need for additional space, to provide for the isolation of newly purchased and of sick animals. A major improvement was the construction of a ventilation system in the large dog room with capacity of producing twenty air changes per hour.

At the end of June, Dr. R. C. Ritchie, Supervisor of the Committee on Experimental Research, is giving up his post. For many years he has been responsible

for the direction of and improvements made in the animal facilities, and his presence will be greatly missed. In the coming year, the section will be called the Committee on Animal Care, with Dr. A. G. Gornall as Chairman, and Dr. H. Baer, Director of Animal Care.

Dr. Baer was the second Canadian veterinarian to be accepted as an Associate Member of the American College of Laboratory Animal Medicine.

Publications

A report by Dr. Baer, of the annual Animal Care Panel Meeting, in Chicago, October 2–5, was published in the *Canadian Journal of Comparative Medicine and Veterinary Science*, November, 1962.

MEDICAL BIOPHYSICS

Under the direction of Professor H. E. Johns

During the present academic year Professor Howatson was on leave of absence to collaborate on research projects in electron microscopy with Professor M. Stoker, University of Glasgow, and Dr. W. Bernhard at the Cancer Institute in Paris. Professor Whitmore spent a three-month period as visiting Professor of Biophysics at Pennsylvania State University; and gave a refresher course in radiobiology to the Radiological Society of North America and on radiobiology and radiotherapy to the Radiotherapy Club of Chicago.

During the past year Professor Johns organized the Physics programme and Professor Whitmore the Radiobiology programme for the Tenth International Congress of Radiology held in Montreal. Professor Cinader organized and edited the proceedings of an international meeting on "Immunological Three Component Systems" held in New York. Professor Cinader was recently made a Fellow of the New York Academy of Science.

Undergraduate teaching. Professor Johns gave one-third of the course in Physics given to premedical students. Professor Till gave Physics 18 to physiology and biochemistry students. Professor Ham instructed in half of the laboratory classes in the histology course given to first-year medical students. Professor McCulloch was again in charge of the course in clinical microscopy given second-year medical students.

Graduate teaching. Last year 25 students were enrolled in the Department doing graduate work towards the M.A. and Ph.D. degrees. Five students received their Ph.D. degrees during the year. Eight postdoctoral fellows pursued research studies in the Department. Graduate course work was given in the Structure and Function of Macromolecules and in Radiation Physics. Lectures were given in Advanced Pathological Chemistry.

Postgraduate teaching. In the advanced graduate course given by the Division of Postgraduate Medical Education, Professor McCulloch gave four lectures and two demonstrations. Professors Axelrad, Siminovitch, and Cinader each gave one lecture. The Department is continuing to co-operate in giving lectures in the Diploma Course in Radiology.

Members of the staff delivered lectures and/or papers as follows. Mrs. Almeida of Professor Howatson's group on "Morphology as a Basis for Virus Classification," Canadian Society of Microbiologists, Guelph; on "Visualization of Virus Antibody in the Electron Microscope," Burton Society, Toronto. Professor Axelrad on "Tumour Immunity," the Hospital for Sick Children; on "Immunogenetics of Tissue Transplantation—Normal and Neoplastic," Department of Biology, Queen's University; on "The Paradoxical Role of the Thymus in Immunity and in Leukemogenesis," Department of Biology, Roswell Park Memorial Institute, Buffalo. Professor Baker on "Whole Body Scanning," Tenth International Congress of Radio-

logy, Montreal. Professor BRUCE with Dr. C. L. ASH, on "Survival of Patients Treated for Cancer of the Breast, Cervix, Upper Respiratory Tract and Lung at the Ontario Cancer Institute (Toronto) from 1930 to 1957," Radiological Society of North America; with R. S. BUSH on "The Radiation Sensitivity of Murine Lymphoma Cells *in vivo* as Determined by a Splenic Colony Method," Radiation Research Society; on "Application of the Maximum Likelihood Method to the Early Prediction and Comparison of Radiotherapy Results," Tenth International Congress of Radiology, Montreal; on "Linear Energy Transfer Rates of Electrons Set in Motion by X- and γ-Rays," Second International Congress of Radiation Research, Harrogate, England; with Professor E. A. MCCULLOCH on "The Effect of Hypoxia on Colony-Forming Cells in the Mouse," Federation of American Societies for Experimental Biology, Atlantic City. Professor CINADER on "Perspectives and Prospects of Immunotherapy," Honey Harbour; with Dr. J. D. DUBISKI on "The Effect on Immunogenicity of Acquired Immunological Tolerance," Royaumont, France; on "Antibody to Enzymes—A Three Component System," New York Academy of Science meeting; with Dr. K. J. LAFFERTY on "Antibody as Inhibitor of Ribonuclease; the Role of Steric Hindrance, Aggregate Formation and Specificity," New York Academy of Science meeting.

Professor FUERST on "Incomplete Development of Bacteriophage," thirteenth annual meeting, Canadian Society of Microbiologists. Professor HELLEINER with M. GOLD on "Changes of DNA Polymerase in Synchronized Cultures of Strain L Mouse Fibroblasts," annual meeting, Canadian Federation of Biological Societies, Quebec; with Professor JOHNS on "Effects of Monochromatic Ultra Violet Light on Model Compounds Related to DNA" Canadian Federation of Biological Sciences, London, Ontario. Professor HUNT with J. F. WILLIAMS on "Studies of Radiation Damage to Dry Ribonuclease," Second International Congress of Radiation Research, Harrogate, England; with J. F. WILLIAMS on "Molecular Damage by Radiation to the Enzyme Ribonuclease," at Radiation Research Society, Milwaukee; on "Free Radicals and Radiation Damage in Dry Enzymes," Canadian Association of Medical Physicists, Laval University. Professor JOHNS on "Ultra Violet Effects on Nucleic Acids," symposium on Recent Advances in Molecular Biology at the Royal Society, Laval; on "Ultra Violet Effects on Biological Systems," Harrison Hot Springs, B.C.; on "Molecular Biology and Cancer," Canadian Cancer Society; on "Practical Considerations concerning Radiation in the 1–30 MeV Range in Therapy," Tenth International Congress of Radiology, Montreal; with C. W. HELLEINER on "Ultra Violet Effects on DNA and RNA Constituents," Canadian Association of Medical Physicists, Laval University; at the symposium on "Molecular Changes Responsible for the Effects of Ultra Violet Rays on Nucleic Acids," Radiation Research Society, Milwaukee.

Professor MCCULLOCH on "Viral Carcinogenesis," Calgary and District Medical Society; on "Kinetics of Proliferation of Mouse Haematopoietic Colony-Forming Cells," Ninth International Congress of Haematology, Mexico City; on "Radiobiological Studies on Colony-Forming Cells from Mouse Bone Marrow," Tenth International Congress of Radiology, Montreal; on "Differentiation and Proliferation in Clones of Haematopoietic Cells *in vivo*," Montreal Cancer Institute; on "Studies of Clones of Hemopoietic Cells in the Mouse," The Wistar Institute, Philadelphia; on "Studies of Clones of Haematopoietic Cells *in vivo*," M. D. Anderson Hospital and Tumor Institute, Texas. Professor PARSONS on "Negative Staining of Gross Leukemia Virus in Thinly Spread Cells and after Partial Purification," Fifth International Congress for Electron Microscopy, Philadelphia; on "Cathodes for the Electron Microscope," Burton Society of Electron Microscopists, Toronto; on "Electron Microscopy of Two Types of Subunits on the Membranes of Mitochondria," Biophysical Society, seventh annual meeting, New York. Professor SIMINOVITCH on "The Chemical Basis of Heredity," Canadian Orthopaedic Association (Clinical Portion); on "Biological Problems in Viral Carcinogenesis," fifth annual meeting, Ophthalmology Society; on "Viruses and their Relation to Tumours," annual meeting, Royal Society of Canada; on "The Chemical Basis of Heredity," Canadian

Society of Clinical Investigation, Edmonton. Professor TILL with Professor E. A. McCULLOCH on "Repair Processes in Irradiated Marrow Cells *in vivo*," Second International Congress of Radiation Research, Harrogate, England; with Professor E. A. McCULLOCH on "Repair Processes in Irradiated Mouse Hematopoietic Tissue," New York Academy of Science; on "Quantitative Aspects of Radiation Lethality at the Cellular Level," American Radium Society, San Francisco; on "A Stochastic Model of Stem Cell Proliferation," Canadian Association of Medical Physicists, Laval University.

RESEARCH

The research work of the Department entailed a good deal of collaboration among many of the staff and was conducted along the following four lines: (1) Cell and Radiation Biology; (2) Studies on Virus and Tumours; (3) Immunology and Immunochemistry; (4) Clinical and Isotope Radiation Physics.

Cell and Radiation Biology

During the past year, several members of the Department have collaborated to exploit the spleen colony technique, which was developed by Professors Till and McCulloch. A brief description of some of the features of this technique will be given before the specific studies accomplished this year are outlined.

Spleen colonies are macroscopically visible discrete aggregates of haemopoietic cells. They are observed 9–14 days after the transplantation of a small number of normal haemopoietic cells into irradiated mice, or they may develop without cell transplantation in the spleens of sublethally irradiated mice. Histologically, the colonies contain cells of various levels of differentiation, and often more than one cell line is represented within a single colony. During the past year, Dr. Becker, working under the direction of Professor Till, showed by direct cytological means, that each of these colonies is derived from a single cell. Thus the opportunity is available to study the development of a single colony-forming cell into a macroscopic colony consisting of more than a million cells of several differentiated types.

Professors Till and McCulloch have employed a radiobiological method to study the proliferation of colony-forming cells. Their studies, using both transplanted and endogenous colony-forming cells, indicate that the kinetics of proliferation of these cells is strongly influenced by the differentiation pressures to which they are exposed.

Professors Siminovitch, McCulloch, and Till have measured the number of colony-forming cells in single colonies after varying periods of growth. They find that colonies are very heterogeneous in respect to their content of colony-forming cells, with many colonies containing very few colony-forming cells, and a few colonies with very many. The development of this heterogeneity is under study from physiological and genetic viewpoints.

Professors Bruce and McCulloch have employed the spleen colony method for the study of erythropoiesis. They exposed mice to hypoxia, and observed the development of polycythaemia in the animals. They found the usual sequence of haematological changes consisting of a reticulocyte peak, and an early increase in iron-incorporating cells of spleen and marrow. They also observed a decrease in the number of colony-forming cells in the spleens of the hypoxic mice. This decrease accompanied the increase in reticulocytes and iron-incorporating cells, and also continued after these parameters of erythropoiesis had returned to normal. The changes are interpreted to indicate that increased demand for differentiated cells is accompanied by a loss of colony-forming cells.

Professor Bruce has shown that lymphoma cells from AKR/J mice, when injected into irradiated or normal recipient mice of the same strain, give rise to macroscopic discrete colonies. These may be counted in exactly the same way as the colonies derived from normal marrow cells. The method has been used as an assay for the colony-forming capacity of lymphoma cells in studying the growth of tumour cells *in vivo* and in determining the radiation survival of lymphoma cells.

Professors Siminovitch, Till, and McCulloch have found that the radiation survival curves for the immune response to bacterial virus antigen is sigmoidal, with a very pronounced shoulder region, followed by an exponential portion. The mean lethal dose of the exponential portion of the curve is similar to that observed for the proliferative capacity of mammalian cells. Radiobiological techniques are being used to analyse the recovery of immune potential following radiation injury.

Professors Whitmore and Till are continuing their studies of the effects of radiation on the cell at various stages of the cell cycle. They have demonstrated pronounced differences in the degree of mitotic delay experienced by cells irradiated in various parts of the DNA synthetic cycle. Professor Whitmore is also investigating the nature of the recovery processes occurring in mammalian cells given fractionated doses of radiation. With Mr. C. Pujara he has investigated the role of bromodeoxyuridine and other pyrimidine analogs as radiation-sensitizing agents. In collaboration with Mr. S. Mak, Professor Till showed that although the major effect of radiation is to block movement of cells into mitosis, the rate of progress of cells into and out of the period of DNA synthesis is reduced.

Professor Hunt has examined the initial steps in the process of damage by ionizing radiation in organic molecules in order to learn more about the mechanisms involved in biological systems. Studies of the free radicals produced by radiation in cyclohexane and its derivatives show that most of the initial damage consists of breaking the weakest carbon to hydrogen bond in the molecule. The radiation damage to a much more complicated molecule, the enzyme ribonuclease, is also being studied in detail. The damage here may be explained in terms of the breakage of certain bonds which hold the molecule in a tight coil. In addition the removal of hydrogen atoms from the main protein chain appears to be an important mechanism of damage. A strong parallel exists between some of the results with the irradiated enzyme, and the work of other laboratories using living organisms.

Professor Johns working with Professor Helleiner and Professor Whitmore is investigating the effects of ultra violet light in producing specific molecular changes in DNA and RNA and model compounds similar to them. For this work Professor Johns constructed a large grating spectrometer to produce intense beams of monochromatic ultra violet light in the range from 2,000 to 400 Å. Investigations of this kind are of interest because of the recent findings that ultra violet light produces specific lesions in DNA and RNA. At the molecular level one form of these lesions consists of a link between adjacent bases in a polynucleotide chain to form dimers of thymine and uracil.

Professor Helleiner has synthesized dinucleotides of uracil and thymine which should behave in a similar way to short portions of DNA and RNA. Working with Professor Johns and Mr. Pearson these model compounds have been irradiated and the various photo products isolated chromatographically and quantitatively studied. In uracil at least four major photo products are produced by small doses of U.V. These consist of two dimers and two water addition products. The biological significance of these "lesions" is being related to work being done in collaboration with Professor Grossman of Brandeis University, who is studying the effects of U.V. in altering the ability of polyuracil to act as a template in protein synthesis. Professor Whitmore with Mr. Logan is setting up such a protein synthesizing system so that the effects of U.V. on messenger and soluble RNA may be investigated.

The biological significance of thymine dimers is being investigated in T2, T4, and T6 bacteriophages by Mr. Cavilla, working with Professor Johns and Dr. Rauth. In this system the thymine dimers induced by U.V. in the bacterial viruses can be repaired by subsequent photoreactivation. The photoreactivable damage is being investigated as a function of the wavelength at which the damage was produced.

Dr. Rauth working with Professors Whitmore and Johns has studied the U.V. sensitivity of a number of bacteriophages (T2, ϕx174, MS2, R17) and animal viruses (vesticular stomatitis, encaphelomyocarditis, polyoma, vaccinia). These

show variation in absolute sensitivity of a factor of about 100 at any one wavelength and show differences with wavelength depending upon whether the nucleic acid in the virus is present as a single or double strand.

Professor Helleiner has continued his research on the enzymes concerned in the biosynthesis of DNA in mammalian cells grown *in vitro*. Mr. M. Gold has completed a study of the DNA-polymerase of these cells, and further purification is being undertaken by Mrs. M. Percy. Mr. T. Griffith is continuing his work on the deoxyribonucleotide kinases.

Professor Parsons has developed a new technique to visualize the subunits on the membranes of mitochondria. The relation between the subunits of the cristae and the electron transport system is being investigated in collaboration with Professor Williams of the Department of Biochemistry.

In an attempt to improve the resolution and contrast available from the electron microscope Professor Parsons has developed a method for producing point cathodes. These point cathodes may also be used in electron diffraction studies. With Mr. Boeckner an electron diffraction study of anthracene and urea is being initiated to determine the optimum conditions for study of organic substances.

Studies on Virus and Tumours

While Professor Howatson was on sabbatical leave, Mrs. Almeida continued work on the fine structure of viruses using negative staining and the frozen section method of examining viruses within cells. Mrs. Almeida was able to visualize for the first time both street (wild) and fixed (tissue culture adapted) rabies virus. The intimate morphology of this virus was of great interest as the internal helix was seen to be double. The presence of a double helix in viruses such as rabies had previously been suspected but this was the first electron microscope evidence of such a structure. Another extension of the negative staining technique allowed the study, in collaboration with Professor Cinader, of the nature of antigen-antibody complexes and showed the different types of patterns obtained in a series in which the ratio of antigen to antibody concentration was varied. Finally with the information obtained from the many different kinds of viruses examined by negative staining it has been possible to draw up a purely morphological classification of viruses which corresponds so well with biochemical classifications that many properties of a virus can be deduced once the morphology of the particle is known.

Professors Siminovitch and McCulloch have continued their study of carcinogenesis in newborn rats using polyoma virus. They have shown that in this host the virus does not multiply. Therefore, the carcinogenic response to the virus can be studied without the complication of viral multiplication. A useful titration has been developed based on the observation of discrete tumour nodules in the kidneys of rats 40 days after injection with the virus. Studies on the effect of the age of the animal at the time the virus is given have shown that susceptibility declines slowly for 5–6 days, and then declines very rapidly. The mechanisms of this loss of susceptibility are under study.

Since previous work had shown that polyoma virus could induce necrotizing lesions as well as tumours, Professor Ham, in collaboration with Dr. D. L. McLeod, has studied a variety of viruses that ordinarily cause necrotizing lesion in man. They injected these into newborn hamsters and found that two of these, adeno 12 and adeno 18, had tumourigenic effects.

Professor Axelrad had shown that a substantial resistance to the proliferation of transplanted leukaemic cells can be rapidly built up in normal adult host mice by pretreatment of the hosts not only with intact leukaemic cells but also with extracts of such cells. Furthermore when similar extracts were given to newborn animals rather than to adults and the animals challenged later in life with leukaemic cell transplants, it was found that resistance to the proliferation of the leukaemic cells was reduced. Many of the cells that would otherwise have been inhibited were permitted to grow freely, as if the hosts had been rendered immunologically tolerant

to the foreign antigens on the leukaemic cells. Present work is directed toward isolating the active material in the leukaemic cells. This work is being done on cells derived from leukaemias induced by virus. Studies are also being carried out to determine whether an analogous phenomenon occurs with cells derived from spontaneous leukaemias.

Professor Siminovitch with Mr. Kajioka has continued his studies on the development of vaccinia virus using electron microscopic and autoradiographic techniques. Information has been obtained on the effects of various inhibitors on the development of vaccinia virus.

J. Friesen and Professor Siminovitch have showed that the vaccinia virus cell complex decreases in sensitivity to Co^{60} γ-rays during virus multiplication and that the change occurs roughly at the same time as the nucleic acid of the virus is synthesized.

Dr. Sheinin in Professor Siminovitch's group has shown that fluorodeoxyuridine, an inhibitor of deoxyribonucleic acid synthesis, inhibits the synthesis of polyoma virus. Although no virus is obtained polyoma virus protein is synthesized in approximately normal amounts.

Dr. C. P. Stanners, with Professor J. E. Till, has studied the properties of "transformed" clones of cells isolated from hamster embryo cultures infected *in vitro* with polyoma virus. These transformed clones, selected on the basis of their colony morphology, have been shown to give rise to tumours when injected into adult hamsters. Several methods have been developed which permit the detection of small numbers of transformed cells in the presence of many normal cells.

Professor C. R. Fuerst, with Drs. Kaighn and Moscarello, has studied the properties of plaque-type mutants of murine encephalomyocarditis virus. A procedure has been devised by which it is possible to obtain very pure preparations of this virus. Studies of the amino acid and base compositions of the mutants are being carried out. The growth cycle of one of the plaque-type mutants has been studied in detail. This particular mutant is of interest because it normally reproduces with low frequency in Earle's L strain of mouse cells. This frequency can be increased by treating the cells briefly with heat prior to infection. Studies undertaken during the past year suggest that the events responsible for the failure of virus to reproduce in untreated cells occur soon after adsorption of the particles to host cells. Professor Fuerst, with Mr. D. Mount, has begun a genetic and biochemical analysis of a large number of defective lysogenic strains of *E. coli* K 12 (λ), the purpose being to map genetic elements involved in λ reproduction and to identify the gene products themselves.

Immunology and Immunochemistry

Professor Cinader working with Drs. Chou, Dubiski, and Fujio has shown that adult cells treated with antigen and transferred to newborn animals elicited an antibody response within 14 days. This is surprising since soluble antigens given shortly after birth do not usually cause antibody formation. The reasons for this difference are being investigated. As part of this study it was shown that irradiation of the donor cells increases the antibody response up to doses of the order of 4,000 rads.

Working with Mr. J. St. Rose, Professor Cinader is investigating the degree of chemical change which must be made to an antigen in order that an animal made tolerant to it at birth will make antibody to the altered antigen.

Working in collaboration with Dr. K. Lafferty, Professor Cinader has shown that there are two kinds of antibodies to ribonuclease. The first of these antibodies inhibits the enzyme in the usual way while the second blocks the action of the first antibody. It was also shown that the effect of the antibody could be increased by adding agents which aggregated the antibody enzyme complex. Working with Dr. S. Ben-Efraim, Professor Cinader is studying the interaction of antibody with ribonuclease which has been modified by the addition of polypeptide side chains in order

to elucidate further the antibody enzyme interaction. In collaboration with Dr. Dubiski a new group of allotypic specificities in the α globulins of mice has been discovered.

Clinical and Isotope Radiation Physics

Dr. Cunningham and Dr. Wright, working in collaboration with the International Atomic Energy Agency, have calculated the dose distribution within phantoms, which represent patients undergoing rotation radiation therapy. This work was done using the IBM computer in the Institute of Computer Science. The results will appear as an extensive atlas giving the type of dose distribution which may be achieved in a variety of irradiation conditions.

Dr. Wright, Dr. Cunningham, and Mr. S. Gupta have produced programmes for the IBM computer which may be used to calculate the dose distribution around radium needles and from external Cobalt 60 beams used in radiation therapy. As an example of this they have devised a way to shape the beam of radiation to fit individual patients so that dose inhomogeneities in the tumour region may be avoided.

Dr. Wright, working with Dr. B. Holmes of the Toronto General Hospital, has devised a method for evaluating the performance of image intensifiers used in radiology.

Professor Baker working with Dr. Simpson and Dr. Rotenberg continued to use the large body isotope scanner to investigate a number of pathological conditions in patients. In particular they studied the distribution and utilization of iron in patients suffering from bone marrow dysfunction. They were able to locate bone metastases using Sr^{85} before they could be demonstrated radiologically. In collaboration with Professor Gunton of the Toronto General Hospital they were able to demonstrate and locate with fair precision the site of myocardial infarcts in dogs and patients using labelled oleic acid conjugated with albumin. Working with Dr. Sass-Kortsak and Dr. Aspin they continued the study of copper metabolism in normal subjects and in patients with Wilson's disease. By following the distribution of Cu^{64} they were able to demonstrate that in patients with Wilson's disease there was a diminished rate of uptake and utilization of Cu^{64} in the liver. Differences in the tracer dynamics of copper between normal and prospective Wilson's disease patients were used to effect an early diagnosis.

By examining close relatives of persons suffering from Wilson's disease they were able to identify Wilson's disease prospects before the disease was apparent clinically so that preventative therapy could be initiated.

Professor Baker working with Mr. J. Scrimger is developing an autofluoroscope type of gamma camera using a crystal 11½ inches in diameter. With this device it will be possible to get a continuous "picture" of the distribution of radioactivity within the patient. It will be particularly useful in dynamic studies where rapid transport of isotope from one organ to another is involved. Dr. Aspin working with Dr. Sass-Kortsak and Professor Moody of the Institute of Biomedical Electronics is developing a transistorized version of the autofluoroscope for use in the Hospital for Sick Children.

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MEDICINE

Under the direction of Professor K. J. R. Wightman

This has been a year of briefs, questionnaires, and long-term projections. The signs of rapid expansion are to be seen in all hospitals and in all sections of the Department. The addition of new teaching facilities in the New Mt. Sinai Hospital and at the Princess Margaret Hospital has been most welcome. It has made possible the allocation of smaller numbers of students to each teacher on the wards and a more satisfactory experience for the students doing practical work. Facilities at the Toronto Western Hospital have increased while those at St. Michael's Hospital are being increased. We are looking forward to the day when plans at the Wellesley Hospital and the Women's College Hospital come to fruition.

At the same time, the responsibility of a teaching hospital to provide research space is being recognized. Space has been allocated at the Toronto Western Hospital which will be extremely valuable, and it is anticipated that the same thing will happen at St. Michael's Hospital. The Blood and Vascular Research Unit at 86 Queen's Park is now open and running vigorously. It should serve as a monument to the imagination and flexibility of the University authorities, and to the munificence and civic responsibility of a group of individuals and corporations with the guidance of Mr. George Gardiner and Mr. Percy Gardiner.

None of the research facilities is as yet adequate for the needs of the moment, let alone to-morrow. Many of them are in temporary locations, and the definitive needs of the Department as a whole amount to a rather staggering total. Both the teaching hospitals and the University are giving serious consideration to these problems.

At the same time there is concern about the effect of medical care insurance on the function of teaching wards, and various committees are studying this problem.

It is a matter of extreme regret to report that two members of the staff are deceased. Dr. J. W. Graham, who was head of the Rheumatic Disease Unit and Associate Professor in charge of Ward H at the Toronto General Hospital, died suddenly when he seemed to be at the height of his powers. He was President of the Academy of Medicine of Toronto, Chairman of the Medical Committee of the Gairdner Foundation, and holder of many other important offices. His loss has been very greatly felt. Dr. Ann-Jane Carter was our other loss. She too was working in the field of rheumatology, at St. Michael's Hospital, and was cut off at the beginning of what seemed to be a very promising career.

Dr. F. C. Hamilton reached retiring age, and Dr. Hagar Hethrington resigned to assume an important function in a new hospital. Dr. P. H. Melville severed his connection with the Department of Medicine in order to undertake full-time duties at the Toronto Psychiatric Hospital. We regret to say farewell to these men. We are immensely grateful to them for their services in the past, and we hope that we can depend on their support in the future.

The staff has been strengthened by the addition of Dr. R. Hasselback and by eight members of the staff of the New Mt. Sinai Hospital (Dr. M. Kohan, Dr. L. Cole, Dr. I. Rother, Dr. H. Goldenberg, Dr. O. Kofman, Dr. P. S. Rosen, Dr. A. Sharp, Dr. S. P. Starkman). During the past year they have taught third- and fourth-year students. The Medical Out-patient Department of the hospital has been used for this final year teaching, and four additional members of staff have served as voluntary assistants in this work: Drs. Chesnie, Fremes, Levinne, and Shleser.

The usual postgraduate activities have continued. The Department was host to a regional meeting of the American College of Physicians embracing the area of western New York State and Ontario. With the guidance of Dr. Ian Macdonald, the advanced graduate course in medicine and special courses in diabetes and neurology were successfully carried out. Members of the Department contributed papers to a wide variety of national and international meetings as indicated in the appended list.

One of the interesting events of the year was a meeting at the Academy of Medicine commemorating "Forty Years of Insulin." Dr. W. R. Campbell and Dr. A. A. Fletcher took part in this meeting, having been responsible for the first clinical use of insulin.

As usual there were many visitors from other centres who gave generously of their time and energy and helped us greatly. They include Dr. David V. Bates of Montreal, Dr. Eric Bywaters of London, England, Prof. J. V. Dacie and Dr. P. L. Mollison of London, Dr. J. H. B. Hilton and Dr. R. K. Smiley of Ottawa, Sir Harold Himsworth of London, Prof. Raoul Kourilsky of Paris, Dr. Shaul Kochwa of New York, Dr. Hermann Lehmann of London, Dr. R. M. Marquis of Edinburgh, Dr. Georges Mathe of Paris, Dr. E. Clinton Texter of Chicago, Lord Brain, Dr. Chinard of Montreal and Dr. Chalmers of London, England. In addition the Department was visited by a number of the recipients of the Gairdner Awards, including Dr. Coons, Dr. Kunkel, and Dr. Sarnoff.

Dr. W. A. Oille was our visitor to the Middlesex Hospital, London, this year, in order to facilitate his studies of the curriculum and problems of medical school organization.

Dr. C. R. Burton has taken the post of Administrative Assistant to the Professor. The helpful co-operation of members of the Department at all levels is gratefully acknowledged.

Following is a partial list of the papers presented by members of the Department at various meetings.

Dr. H. J. M. Barnett, "Neurologic Amyotrophy—A Clinical Entity Mistaken for Cervical Disc Syndrome," Royal College of Physicians and Surgeons of Canada. Dr. D. S. Beanlands, "Demonstration of Myocardial Infarction by Photoscans of

the Heart," Canadian Cardiovascular Society. Dr. J. H. Crookston, "Blood Coagulation and Platelet Economy in Subjects with Myeloproliferative Disorders," Canadian Society for Clinical Investigation; "Platelet Economy and Blood Coagulation in Myeloproliferative Disorders," International Society of Haematology. Dr. J. R. Evans, "The Use of Radioiodinated Fatty Acid for Photoscans of the Heart," American Heart Association; "A Demonstration of Myocardial Infarction with RIFA Photoscans," American Heart Association; "Some Concepts of Normal and Disordered Myocardial Metabolism," Research Seminar, Royal Victoria Hospital, Montreal; "Demonstration of Myocardial Infarction by Photoscans of the Heart," Canadian Cardiovascular Society; "The Importance of Lipid in Abnormalities of Intermediary Metabolism," Sacrement Hospital, Quebec; "The Spectrum of Myocardial Metabolism," Academy of Medicine, Hamilton; "Photoscans of the Heart with Radioiodinated Fatty Acid," Canadian Society for Clinical Investigation; "Myocardial Metabolism of Individual Unesterified Fatty Acids," Federation of American Societies for Experimental Biology; "Lipid Transport," Symposium on transport mechanisms, Canadian Biochemical Society.

Dr. R. F. Farquharson, "Anorexia Nervosa," regional meeting, American College of Physicians. Dr. W. F. Greenwood, "The Effect of Mitral Commissurotomy on the Incidence of Systemic Emboli," Canadian Cardiovascular Society. Dr. R. W. Gunton, "The Use of Radioisotopes to Estimate Myocardial Blood Flow; preliminary studies of external myocardio photoscanning," Royal College of Physicians and Surgeons of Canada. Dr. J. F. Mustard, "Platelet Survival and Turnover in Subjects with Haemorrhagic Disorders," International Society of Haematology; "Intimal Thrombosis in Atherogenesis," Chicago Heart Association (International Symposium on Atherosclerotic Plaque). Dr. E. A. McCulloch, "Viral Carcinogenesis," McGuffin Memorial Lecture, Calgary; "Radiobiological Studies on Colony-Forming Cells from Mouse Bone Marrow," Tenth International Congress of Radiology, Montreal; "Kinetics of Proliferation of Mouse Haematopoietic Colony-Forming Cells," Ninth International Congress of Haematology, Mexico City; "Studies of Clones of Haematopoietic Cells in the Mouse," The Wistar Institute, Philadelphia; "Studies of Clones of Haematopoietic Cells *in vivo*," M.D. Anderson Hospital and Tumour Institute, Texas.

Dr. M. A. Ogryzlo, "Malignant Granulomatosis: Polyarteritis with Respiratory Granulomas," regional meeting, American College of Physicians. Dr. G. B. Peckham, "Combined Percutaneous Retrograde Aortic and Transseptal Left Heart Catheterization," Canadian Cardiovascular Society. Dr. J. C. Richardson, "Supranuclear Ophthalmoplegia, Pseudo-Bulbar Palsy, Nuchal Dystonia and Dementia—A Clinical Report on 8 Cases of Heterogeneous System Degeneration," American Neurological Association. Dr. W. B. Spaulding, "Aglycosuric Diabetes," Royal College of Physicians and Surgeons of Canada. Dr. R. Volpé, "The Effects of Varying Experimental Conditions on the Serum Binding of Thyroxine and Triiodothyronine," Canadian Society for Clinical Investigation; "Evidence Favouring the Sarcomatous Origin of an Insulin-Like Substance in a Case of Fibrosarcoma With Hypoglycaemia," Royal College of Physicians and Surgeons of Canada. Dr. J. R. Wherrett, "Contribution to the Biochemistry of Tay-Sachs Disease," American Neurological Association; "An Analysis of Human Brain Ganglioside Fractions Obtained by Preparative Thin-Layer Chromatography," Federation of Biological Societies. Dr. D. M. Whitelaw, "Cancer Chemotherapy," International Medical Assembly of Southwest Texas.

Dr. K. J. R. Wightman, "Many Facets of Malabsorption," Interstate Postgraduate Medical Association, Chicago; "Adverse Reactions to Drug Therapy," graduate meeting, Medical Alumni Association, University of Toronto; "The Use of Radio-Isotopes in Haematological Disorders," Tenth International Congress of Radiology; "Pseudo-science in Therapeutics," Hippocratic Society, University of Western Ontario; Annual Lecture in Geriatrics, Baycrest Hospital. Dr. E. D. Wigle, "Results of Ventriculotomy in Muscular Subaortic Stenosis," Canadian Cardiovascular Society; "Idiopathic Ventricular Septal Hypertrophy Causing Muscular

Subaortic Stenosis," regional meeting, American College of Physicians; "Sub-aortic Muscular Stenosis," International Society of Cardiology. Dr. E. R. YENDT, "The Response of Hypercalcaemia in Sarcoidosis to Chloroquine," Royal College of Physicians and Surgeons of Canada.

RESEARCH

Allergy

Studies at the Western Hospital under the direction of Dr. J. Fitzgerald, Dr. A. H. Sepp, Dr. R. Bladek, Dr. Alice Briggs, and Dr. Larry Rosen include work on the reaction to insect bites and the value of repository antigen therapy. Dr. Dorothy Ley is collaborating in an evaluation of the basophil degranulation test in allergic disorders. A joint project with Dr. Donald Wilson of the Department of Surgery has to do with the performance of unilateral glomectomy in patients who have intractable asthma.

Cardiovascular

At St. Michael's Hospital a diagnostic unit with facilities for preoperative studies is being developed. A study of the natural history of cardiac infarction is continuing. At the Wellesley Hospital a rehabilitation programme has been established for patients convalescing from acute myocardial infarction by Dr. D. Murnaghan and Dr. C. M. Godfrey. At the Toronto Western Hospital Dr. Susan Lenkei has been comparing the Levy anoxaemia tests with the Double Master Exercise test in the evaluation of cardiac disability. She has measured the changes in serum potassium in patients who are being operated upon with an extracorporeal shunt. In collaboration with Mr. Roy she has carried out estimations of blood volume and weight change in these patients to determine any gain or loss of blood which may have occurred during the procedure. Dr. Yaski and she are reviewing the experience with bacterial endocarditis in the hospital during the past fifteen years. Dr. Lenkei also took part in the investigation of subaortic muscular hypertrophy. Dr. A. Kerwin has been making continuous records of electrocardiograms in patients with recent coronary occlusion and has been studying the use of electric countershock in patients who have arrhythmias which are resistant to drug therapy.

At the Toronto General Hospital Dr. K. W. G. Brown and Dr. R. L. MacMillan have established a unit for the intensive care and observation of patients with recent myocardial infarction. During the first year, 230 patients were admitted to this unit. Valuable new information has been obtained about the heart rhythm at the time of death in many of these patients. Three patients have been resuscitated after they were clinically dead. The nurses in the unit were especially trained and with the monitoring equipment devised, it was possible for one nurse to look after 4 seriously ill patients at one time. A study of the value of intensive heparin therapy immediately upon admission to hospital in acute myocardial infarction revealed that this treatment was of no value. Long-term dicumarol therapy at various dosage levels is being evaluated in conjunction with Dr. J. F. Mustard at the Blood and Vascular Disease Research Unit. Dr. J. R. Evans is investigating the intermediary metabolism of heart muscle in the isolated perfused rat heart using labelled substrates, particularly long chain fatty acids. Methods of evaluating myocardial blood flow in the intact animal by the use of radio-isotopes are also being sought. A clinical follow-up of patients with congenital and rheumatic heart disease is being carried out with a view to determining the natural history of such conditions as ventricular septal defect and aortic stenosis. Dr. W. F. Greenwood has completed an analysis of the results of treatment of a group of patients with mitral stenosis, which has been published. Eight patients suffering from rupture of the sinus of Valsalva have been studied in detail. Dr. R. W. Gunton, in association with Dr. J. R. Evans, Dr. J. C. Spears and Dr. R. G. Baker, has been working on a method to label cardiac muscle with radio-isotope in such a way as to allow external photoscanning to be carried out.

They have found that radio-iodinated fatty acid albumin localizes preferentially in the myocardium in sufficient concentration to allow such scans to be made, and furthermore that the presence of a cardiac infarct can be demonstrated by this means. A great deal of basic work has been carried out in animals and in patients. Many details remain to be worked out, but the principle appears to be unique. Dr. J. C. Spears has been reviewing the electrocardiographic changes in several hundred patients with subarachnoid haemorrhage. Dr. J. Morrow is studying the treatment of hypertension with drugs. The interest of Dr. E. Yendt and Dr. J. Laidlaw in hypertension is noted below.

Dr. E. D. Wigle, working with Dr. H. Aldridge, has established the technique of combined percutaneous retrograde aortic catheterization with transseptal left heart catheterization as the method of choice in investigating lesions of the left side of the heart. Right heart catheterization can be performed at the same time if necessary, so that a complete haemodynamic investigation of the patient may be carried out during one procedure. Dr. Wigle has carried out an extensive survey of patients with muscular subaortic stenosis from the points of view of diagnosis, surgical therapy, and the effect of various types of drugs. New electrocardiographic and radiological methods for the diagnosis of this condition are being defined. Investigation of various aspects of the blood pressure in the pulmonary circuit have included study of the mechanism of action of acetylcholine and the effect on it of the plasma pseudo-cholinesterase level (with the assistance of Professor W. Kalow of the Department of Pharmacology). Blood clotting studies in venous and arterial blood are being pursued in patients who have pulmonary hypertension, with the co-operation of Dr. J. F. Mustard.

Clinical Chemistry

Dr. W. R. Campbell, who as an emeritus member of the staff is still supported by grants from the Medical Research Council, is continuing his effort to develop methods for the simultaneous determination of calcium and magnesium in body fluids, urine, and feces.

Dermatology

Dr. M. G. Williams, with the support of the Foster Bequest, has continued his study of viral reactions in various skin disorders in the Department of Medical Biophysics.

Endocrinology

Adrenal: Dr. J. C. Laidlaw and Dr. C. R. Bird, in collaboration with Professor Gornall of the Department of Pathological Chemistry, are studying the role of aldosterone in hypertension. A patient with primary aldosteronism associated with non-tumourous adrenals has been studied and operated upon successfully. The use of progesterone as a means of treating patients with primary aldosteronism and as a means of studying the mechanism of hypertension in other types of patients has proved interesting. Six patients with renal artery occlusion having potassium depletion with increased aldosterone secretion have now been studied. Five of these patients have been cured of their hypertension by unilateral nephrectomy, with a reduction in aldosterone secretion rate.

Diabetes. Dr. W. Spaulding with the assistance of medical students working in the Medical Out-patients Clinic has found that blood sugar levels after carbohydrate-rich meals do not rise as much as might be anticipated in normal or mildly diabetic subjects. Dr. Nicholas Forbath, working in collaboration with Dr. C. Hetenyi of the Department of Physiology, has been studying the response of patients with a variety of disturbances of carbohydrate metabolism to a sudden glucose load using C14 labelled glucose as an indicator. Dr. C. Ezrin and Dr. Neiman are working on the problem of insulin binding in plasma and clinical insulin resistance. At the Wellesley Hospital Dr. G. W. Smith has tested Tolinase in diabetic patients as an

index of its toxicity. At St. Michael's Hospital Dr. Grant Nadon, Dr. W. E. Hall, and Mr. Michael O'Sullivan have been studying the relative efficiency of the intravenous glucose tolerance test and the oral test in the diagnosis of borderline diabetes.

Gonads: Dr. Bird and Miss M. Stiefel have devised techniques for the study of the disappearance rate of injected tritiated progesterone in human plasma. Estrogen, which greatly prolongs the biological half-life of hydrocortisone in plasma, has no effect on that of progesterone. Dr. Guy Emery has demonstrated with Miss Stiefel that estrogen has no effect on the binding of progesterone in plasma.

Parathyroids, Calcium, and Magnesium: Dr. E. R. Yendt, with Dr. M. Cohanin, Dr. S. York, and Dr. Barbara Hunt, has continued his work on the diagnostic criteria of hyperparathyroidism, the significance of ultra-filtrable calcium levels, problems in magnesium metabolism, vitamin D resistant rickets, and the behaviour of serum and urinary phosphorus under various conditions. The effects of chlorothiazide on calcium excretion and calcium absorption have been found to be extremely interesting. The reduction in urine calcium which occurs during the early administration of the drug may prove to be of value in the treatment of patients with hypercalcuria and renal stone. They have now investigated nearly 400 patients who have recurrent renal calculi of various types. Dr. Joan Harrison, working with a low background whole body counter in the Department of Physics under the supervision of Professor McNeill, and with the collaboration of Dr. J. Finlay, has been studying calcium metabolism in normals and in osteoporotic subjects, using radioactive calcium. Dr. Finlay has studied magnesium deficiency in patients with malabsorption. The incidence of hypercalcaemia and abnormal magnesium levels in neoplastic disease has been studied at the Princess Margaret Hospital, and Dr. D. P. Murnaghan is reviewing the electrocardiographic changes in patients with disturbed serum calcium levels.

Pituitary: Dr. Ezrin's work on pituitary cytology continues, in collaboration with the Department of Pathology.

Thyroid: At the Toronto General Hospital a range of studies is in progress, with the assistance of the Department of Pharmacology. We are fortunate in having the services of an extremely competent biochemist, Mr. Vas Row. The projects under way include detailed studies of iodine metabolism and thyroid disease, studies on the genetic factors in Hashimoto's struma, studies on the binding of thyroxin to serum proteins (in collaboration with Miss Amy Britton of the Department of Pathological Chemistry), methods of assaying Thyrotropin in human serum and investigations of a long-acting thyroid stimulator in Graves' disease. This has involved a team comprised of Dr. M. W. Johnston, Dr. C. Ezrin, Dr. R. Volpé, Dr. Brian Webster, and Dr. S. Neiman. At the Toronto Western Hospital Dr. Robert Sheppard and Dr. Patzauer-Votsch are also studying Thyrotropin and long-acting stimulators. A special study of myxoedema is going on. Dr. Higgins and Dr. Elkin, at St. Michael's Hospital, are investigating the occurrence of abnormal iodinated proteins in the serum of patients with non-toxic goitre. They are also treating patients who have subacute thyroiditis with Triiodothyronine. Dr. Joan Vale is continuing her study of the effect of desiccated thyroid on the function of the thyroid gland, at the Women's College Hospital.

Gastro-enterology

At the Toronto Western Hospital a research unit has been established through the generosity of Miss Elsie Watt. This unit will eventually be endowed with an income from her estate and is at present being supported by annual grants from the donor. At the Toronto General Hospital, Dr. J. M. Finlay, with the assistance of Dr. M. Vidinli and Dr. K. Mathur, has carried on with projects related to malabsorption, including bacteriologic studies and refinements of biopsy techniques in collaboration with the Department of Pathology. Cinegastroscopy has been introduced. Preliminary work on the technique of gastric cooling and freezing has began

with the aid of Dr. N. T. McPhedran of the Department of Surgery. Dr. J. C. Sinclair has continued his work in infectious hepatitis. Five "agents" have been isolated in tissue culture which may turn out to be related to the disease.

Haematology and Neoplastic Diseases

At St. Michael's Hospital Dr. K. Butler has completed a survey of the value of vincablastine in the treatment of Hodgkin's disease. Dr. C. J. Bardawill continues with his study of the levels of a number of enzymes in the plasma and in the leukocytes of patients with leukaemia and cancer. At the Princess Margaret Hospital Drs. Whitelaw, Alison, Hasselback, and Meakin are carrying out a wide range of projects in patients with cancer, lymphoma, and leukaemia. These include studies of iron metabolism, measurement of the immune reaction in these diseases, studies on viruses and enzymes, and investigation of serum proteins and their response to radiation. Clinical trials of a number of chemotherapeutic agents are under way, either singly or in combination with other types of treatment. Dr. E. A. McCulloch has been active in the Department of Medical Biophysics in basic work having to do with methods of measuring radiation effects *in vivo* and a study of viruses. These are reported in more detail elsewhere. At the Toronto Western Hospital Dr. Dorothy Ley with the help of Dr. C. Baines has been engaged in a clinical application of various chemotherapeutic agents, as well as research on iron metabolism in neoplastic disease, serum proteins, platelet survival, coagulation defects occurring during cardiovascular surgery, and the effects of hypothermia and extracorporeal circulation on bone marrow kinetics. At the Toronto General Hospital Dr. J. H. Crookston, Dr. J. G. Scott, Dr. T. W. Fox, Dr. D. E. Dwyer, and Dr. J. F. Mustard are carrying on with twelve projects having to do with the mechanisms of haemolytic anaemia, the behaviour of platelets in various conditions, coagulation defects of various sorts, aplastic anaemia, chromosome studies, and blood volume changes. In this connection it may be noted that the collaboration with Dr. H. Rowsell, Dr. Colin R. Cameron, and Dr. H. C. Downie of the Ontario Veterinary College in Guelph has proved to be extremely helpful and has been very much appreciated not only by the haematological group but also by the workers in the field of atherosclerosis. It is to be hoped that this fruitful association will not only continue but will increase in scope.

Metabolic Studies

At the Western Hospital Dr. A. Rapoport has begun a study of the metabolic effects of total fasting in obese patients. At St. Michael's Hospital Dr. Alick Little has been appointed Director of the Metabolic Investigation and Treatment Unit on a geographic full-time basis, and a Clinical Investigation Unit has been established. The Farquharson Unit at the Toronto General Hospital has been used by an increasing number of investigators from all the departments of the hospital and has proved to be a tremendous asset. A similar unit is being developed at the Toronto Western Hospital, under the direction of Dr. Rapoport.

Neurology

At the Toronto Western Hospital a new neurological unit was opened on June 15. This is a joint medical-surgical establishment. At this hospital Dr. Silversides and Dr. McIlroy are continuing with the study of multiple sclerosis. At the Toronto General Hospital Dr. Barnet is going on with his study of carotid artery disease with Dr. Lougheed of the Department of Neurosurgery, and has studied a group of paraplegics who have developed lesions at higher levels of the cord as a late complication. Dr. J. Humphrey is working actively in the field of neuromuscular disease, measuring nerve conduction times and carrying out histochemical studies on muscle biopsies. Dr. J. C. Richardson in collaboration with Drs. Olszewski and Steele has defined a new clinical entity with supra-nuclear ophthalmoplegia and pseudo-bulbar palsy. Dr. J. Wherrett is setting up his laboratory for the study of neurochemistry.

Renal Disease

At the Toronto General Hospital Dr. W. T. W. Clarke and Dr. G. J. Pawlowski have been exploring the value of peritoneal dialysis in patients with acute renal failure. A project relating to urinary infection has been carried out with the collaboration of the Department of Bacteriology. Dr. G. W. Smith at the Wellesley Hospital has assisted with the renal dialysis work. Dr. Little has set up an artificial kidney machine at St. Michael's Hospital, while Dr. Rapoport is working on this problem at the Toronto Western Hospital. Dr. Rapoport is also engaged in a co-operative study of renal hypertension with Dr. Wilson and Dr. Ranking of the Department of Surgery, and the study of renal calculi with Dr. Crassweller. Dr. F. M. Hill is studying the incidence and significance of bacteriuria in pregnancy, and in patients admitted to the public medical wards at the Women's College Hospital.

Respiratory Disorders

Dr. C. R. Woolf is looking into the relationship of oxygen in the blood and muscles to the degree of dyspnoea suffered by the patient. A number of studies of respiratory function and various types of cardiac disease have been carried out.

Rheumatology

Under the direction of Dr. M. Ogryzlo, studies of a new therapeutic agent in gout are being carried out, and the project on plasma protein changes in disease is continuing. The therapeutic value of diets free of tryptophan in rheumatoid arthritis is being tested. A detailed review of fourteen cases of Wegener's granulomatosis has been completed. Dr. Hugh Smythe, using labelled uric acid, has been measuring the miscible pool size and the uric acid turnover in normal patients and gouty subjects. Along with Dr. Mustard an attempt is being made to relate alterations in uric acid metabolism to the dynamics of platelet production and turnover. At the Toronto Western Hospital, Dr. J. Crawford, with the help of Dr. William Franks has been working on the effect of cold spasticity, the painful shoulder of patients with hemiplegia and the value of ice in the treatment of various joint disorders.

Vascular Disease

The new Blood and Vacular Disease Research Unit, established at 86 Queen's Park, has made possible a co-ordinated study of the factors in the blood and in the blood vessel which may be related to atherosclerosis and thrombotic disease. This unit is under the direction of Dr. J. F. Mustard and Dr. R. L. MacMillan, and the work there involves Dr. J. H. Crookston, Dr. Hugh Smythe, Dr. K. W. G. Brown, and Dr. Rowsell as well. Coagulation problems, platelet studies, lipid investigation as well as studies on proteins and macromolecules are all going on here. The unit has been beautifully fixed up and extremely well equipped. We look forward to great things from it. At St. Michael's Hospital Dr. Alick Little has been studying the effect of various dietary regimens on serum lipids in an attempt to devise diets which may be of practical value to patients.

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OBSTETRICS AND GYNAECOLOGY

Under the direction of Professor D. E. Cannell

There have been no major changes in teaching during the past year. Both undergraduate and postgraduate courses are under continuing review by the Departmental Committee on Curriculum. Some alterations are contemplated. It is planned to eliminate the oral examinations in the final year during the next session. Completion of the didactic lectures by the end of the third year has been accomplished for the first time. We shall watch the effect of this change with interest.

The legislation for extended medical insurance which has had its second reading in the legislature has occasioned considerable concern to all Ontario medical schools. This will affect all to some degree, but none to as great an extent as those in Toronto. The teaching hospitals may face a marked decrease in patients. In the past ten years, teaching programmes have been developed in Obstetrics and Gynaecology which have proven of great value. It is to be hoped that the combined wisdom of University, medical associations and the government will preserve the quality of medical education in this province.

The Department is pleased to report the success of Doctors J. T. Bate, R. A. Day, J. M. Harvey, and K. M. Irwin in obtaining their fellowship in the Royal College of Physicians and Surgeons of Canada, and of Doctors J. E. Kapsos and J. D. Trelford who received their certification.

The Department was honoured by visitors from abroad, including Professor Hans Kottmeier, Stockholm, Sweden, who delivered an address on Carcinoma of the Ovary; Professors H. C. McLaren, Birmingham, England; T. N. A. Jeffcoate, Liverpool, England; Robert Ross, Chapel Hill, North Carolina; and Drs. J. Stallworthy, Oxford, England; Hans Wendl, Hamburg, Germany; Magnus Haines, London, England.

A refresher course for general practitioners was held in November, 1962, and was so heavily oversubscribed that a further course was given in February, 1963. It is planned to give two of these courses each academic year. Consideration is being given to the establishment of short advanced courses for specialists in Obstetrics and Gynaecology.

The staff has continued to participate in scientific meetings throughout this country and abroad, including participation in a closed television programme on Obstetric Forceps at the annual meeting of the Canadian Medical Association in Toronto. The extent of participation in scientific meetings may be appreciated better by reference to the fact that in one recent national meeting, more than one-fifth of the presentations were made by our staff.

Our staff, in association with representatives from medical schools across Canada, are contributing a symposium on maternal mortality to the American publication, *Clinical Obstetrics and Gynecology*. This is the first occasion that a Canadian group has been requested to do so.

Work on the steroid laboratory has almost been completed. Doctor S. L. Cohen has begun work there and with Doctor Richard Wilson's return from Sweden in the fall, this unit should begin more comprehensive studies. Grateful acknowledgment is made to the Dominion Stores for their continued support of investigation within the Department. Similarly, we are pleased to report further assistance from the Johnson Wax Company and initial support by the Medical Research Council of the new steroid division.

Doctor W. J. Hannah was awarded a McLaughlin Travelling Fellowship and spent six months visiting medical centres in the U.S.S.R., Austria, Germany, Denmark, Norway, Sweden, the Netherlands, Eire, and the United Kingdom, for the purpose of studying European and British methods of undergraduate and postgraduate medical education, with particular attention to Obstetrics and Gynaecology.

Doctor Richard Wilson has continued his studies in Stockholm, Sweden. Doctor S. L. Cohen has joined the Department as a Research Associate and will be associated with Doctor Wilson in the Division of Steroid Chemistry. Doctor I. G. Van Praagh is pursuing further postgraduate studies on uterine motility with Professor Charles Hendricks in Cleveland, Ohio. Doctor J. D. Trelford is spending a year at the Middlesex Hospital in London, England, under the direction of Mr. W. R. Winterton.

The Head of the Department wishes to thank all his colleagues in the Department, Faculty, and University for their co-operation and assistance during the past year. The sympathetic and helpful consideration of Dean Hamilton is greatly appreciated.

Research

Members of the staff have undertaken the following research work.

Dr. W. H. Allemang has continued an investigation and follow-up on a series of cases of abnormal sexual development and presented a review of these cases at the annual meeting of the Society of Obstetricians and Gynaecologists of Canada.

Dr. T. A. Doran and Dr. J. L. Harkins have continued their investigations of a new progestational agent, BDH 1298. Dr. Doran, with a grant from the Ontario Cancer Treatment anud Research Foundation, has also continued his study of malignant cells in the peripheral circulation in patients suffering from endometrial carcinoma.

Dr. J. A. Low has pursued his studies of foetal oxygenation, metabolic state, and anaerobic metabolism as reflected in the umbilical cord at delivery. The maternal-foetal relationships are being assessed with simultaneous placental pool and cord studies at delivery. The plasma and blood volume characteristics of the normal newborn infant and the immediate neonatal adjustments have been studied and a comparable programme is continuing in obstetric complications. Similarly, changes in plasma and blood volume throughout the last trimester and in labour in the normal obstetric patient have been studied and a comparable programme is continuing in obstetric complications. A co-ordinated study of the changes of plasma and blood volume and total body water is being initiated.

The maternal history of obstetric patients with asymptomatic bacteriuria has been studied and the assessment of urinary tract disease and renal function is being carried out in patients with persistent bacteriuria.

A number of clinical aspects of urinary incontinence and abnormal bladder function are continuing to be assessed in the incontinence clinic. A study of the anatomy of the urethra is in progress in association with Doctor Duckworth of the Department of Anatomy.

Dr. J. W. Millson has done further studies of the value of hypotensive agents in toxaemic patients.

Dr. T. G. Ryley has continued his study of patients with amenorrhea, intersexuality, and other congenital abnormalities.

Dr. C. P. Vernon has been engaged in a progestational steroid study in relation to endometrial carcinoma and is incorporating this work with an assessment of massive doses of progestational steroids in advanced carcinoma of the breast. This work has been performed at the Princess Margaret Hospital. He is also conducting a clinical assessment of chemotherapeutic drugs in carcinoma of the ovary and the effect of combined chemotherapy and radiation in advanced gynaecological cancer.

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OPHTHALMOLOGY

Under the direction of Professor Clement McCulloch

During 1962–63 there were fifteen students registered in the three-year graduate training programme in Ophthalmology. The Canadian National Institute for the Blind Fellows were Dr. N. A. Wine of Saskatoon, Saskatchewan, and Dr. H. L. R. Wiebe of Wadena, Saskatchewan. Dr. J. J. Kazdan of Toronto was a Fellow under a Defence Research Board of Canada Grant and Dr. W. G. Rombough of Hamilton was a Fellow under a Dominion-Provincial Public Health Grant. Dr. J. C. C. Alexander, Dr. D. H. Green, Dr. G. J. Jarvis, Dr. D. E. Sillers, and Dr. W. G. Hutchison completed the graduate course. Dr. W. S. Hunter has been studying at the U.S. Armed Forces Institute of Pathology as a R. Samuel McLaughlin Travelling Fellow. Dr. D. M. Mirza of West Pakistan was registered with the Postgraduate Division of the Faculty as an occasional student in Ophthalmology.

Undergraduate training has been given by the Department to the third and fourth medical years in diseases of the inner eye and other ocular disease of general medical interest.

The University of Toronto Eye Alumni held their third clinical convention in November. At that time the five senior residents gave papers, competing for the Alumni Prize. Dr. D. H. Green won the prize for his paper on "Cardiac Slowing During Strabismus Surgery." The Walter Wright Lecture was given the same day by Dr. A. E. Maumenee, Professor of Ophthalmology, Johns Hopkins University, who spoke on immune responses and corneal transplantation. The Alumni have been active, holding several meetings during the year and have supported the Department through the A. J. Elliot Residents' Travel Fund.

The Department sponsored an eye surgery clinical meeting in June. This was held immediately following the annual meeting of the Canadian Ophthalmological Society. Since the programme of the Society contained many scientific papers, including some from Toronto staff, the departmental meeting was composed of operating sessions in the University teaching hospitals in the mornings and continuous, concurrent demonstrations in the afternoons. The two guests of honour were Dr. G. Meyer-Schwickerath of Essen, Germany, and Mr. James R. Hudson of London, England, each of whom contributed to the demonstrations. The programme, which was an innovation, was a great success. Sixty-two ophthalmologists from Canada and the United States attended.

In March the Department put on a departmental research meeting under the direction of Dr. P. K. Basu. The guest of honour was Dr. L. Siminovitch of the Department of Biophysics, who spoke of the fundamental chemistry of viruses and chromosomes. There were seventeen papers given at this meeting. The John Gaby prize, for the best paper given by a Fellow, was won by Dr. J. J. Kazdan for his paper on the interaction of sensory stimuli. The broad scope of the work presented that day reflects the wide interests of the research side of the Department under Dr. Basu. We thank Mr. H. G. Stapells, who continues to make this possible.

The staff's participation in outside conferences and scholarly visits has been extensive and it is only possible to mention a few. Dr. J. Speakman participated at the National Institutes of Health Conference on Glaucoma at Del Monte, and the Refresher Course in Glaucoma, University of California. He also lectured at the University of British Columbia and the University of Saskatoon. Dr. H. R. Hausler participated at the National Meeting of the Association for Research in Ophthalmology in Atlantic City. Dr. J. S. Crawford has taken part in Defence Research Board work as Chairman of the Panel on Visual Problems. Dr. J. C. Hill discussed plastic and reconstructive surgery of the eye and adnexa at the First International Symposium of the Manhattan Eye, Ear and Throat Hospital. Dr. Harry Macrae attended a symposium on ocular tumours at Baylor University, Houston, Texas. Dr. Clement McCulloch attended the opening of the Eye Research Unit, University of British Columbia. This is the first such unit in Canada. He also participated in the American Ophthalmological Society Meeting in Virginia. Dr. C. B. Mortimer contributed to the Gonin Club Meeting in Utrecht. Dr. P. K. Basu read a paper at the International Congress of Ophthalmology, New Delhi. He also gave papers for the Bengal Ophthalmological Society and the Department of Ophthalmology, Keio University, Japan.

Dr. Shusterman has visited the Retina Clinic, Massachusetts Eye and Ear Infirmary, attended a meeting of the New England Ophthalmological Society, and the Annual Clinical Conference of the Wills Eye Hospital. Dr. Thompson, as Chairman of the Eye Bank of Canada, Ontario Division, has appeared on television and radio. Dr. Gordon Kelly, as Secretary of the Canadian Ophthalmological Society and as President of the Seventh Pan-American Congress of Ophthalmology, has been prominent in international ophthalmic affairs. Dr. A. E. MacDonald continues as a member of the International Council of Ophthalmology, the world governing body. Dr. Harry Macrae, as President of the Canadian Ophthalmological Society, has guided that Society's largest and most successful meeting. Dr. J. C. Hill took an active part on the teaching of ocular plastic surgery at the meeting of the American Academy of Ophthalmology and Otolaryngology. Dr. L. A. Lloyd participated in the Frank B. Walsh Conference at Johns Hopkins University. Dr. J. S. Crawford is on the Council of the Canadian Ophthalmological Society. Dr. L. A. Morgan and the university staff at the Hospital for Sick Children are aiding in the preparation of a text on paediatric ophthalmology. The clinical and research staff presented six papers at the East-Central Section of the Association for Research in Ophthalmology meeting in Buffalo. The University Eye Staff of the Toronto General Hospital participated in a course for eye nurses given by the Toronto General Hospital. Dr. Clement McCulloch has been active as Assistant Editor of the *Transactions*

of the American Ophthalmological Society, which are published by the University of Toronto Press. The staff continues regular support to the Section of Ophthalmology of the Toronto Academy of Medicine.

The Department was visited by Professor R. Barrie Jones and Professor E. S. Perkins of London, England, Professor G. Crock of Brisbane, Australia, and Dr. Erik Linner of Sweden as well as by many ophthalmologists from neighbouring regions of the United States and Canada.

The Department has received a grant from the Atkinson Foundation for the purchase of electronic equipment. The Selkirk Eye Foundation Fund and the Eye Alumni Fund have aided study in the prevention and treatment of ocular disease. The A. E. MacDonald Foundation has continued to support the Department in the purchase of books. The Canadian National Institute for the Blind has supported two graduate students and has been most helpful in aiding the teaching of ophthalmic science in Canada.

The Department regrets the loss of Dr. R. C. French who leaves to take a post in the Department of Bacteriology. The death of Dr. T. H. Hodgson is a sad blow, and our sympathy goes to Mrs. Hodgson.

In general, the Department has been busy in many fields and has participated broadly in the ophthalmic world.

Research

Members of the staff have engaged in the following research work:

Under the National Health Grant "Eye Bank and Corneal Transplantation," Dr. P. K. Basu continued his studies on the problems of corneal grafting and vitreous implantation with the assistance of Drs. N. Wine and I. Drysdale, Mr. F. Carre, Mrs. I. Fielding, and Mrs. L. Schubert. A comprehensive study on the cytology of the cornea and vitreous tissues is continuing. Dr. Basu, with the assistance of Dr. P. Sarkar of the Department of Botany, is studying the karyology of the normal as well as that of corneal grafts and diseased cornea. They are also studying the chromosomes of patients suffering from hereditary eye diseases. Dr. Basu and Mr. Carre are studying the behaviour of corneal and vitreous cells *in vitro*. Mrs. I. Fielding and Dr. Basu are studying the immunology of vitreous.

Dr. N. Wine and Dr. Basu have continued their studies on the healing of corneal wounds. Drs. C. McCulloch, G. A. Thompson, and Dr. Basu have been studying the fate of corneal endothelial cells following grafting and have developed a new corneal grafting operation for the treatment of oedematous corneas. Studies on the tissue reaction of different experimental plastic materials in the ocular tissues have been continued. Dr. Basu and Dr. T. M. Sibay are continuing their research on the production of experimental tumours in animal eyes. Dr. Basu, in collaboration with Dr. T. P. Morley and Mrs. M. Preissig of the Department of Neurosurgery, is continuing a study on the growth of human brain tumours in ocular chambers.

In conjuction with the Canadian National Institute for the Blind, Mrs. A. Wolf is continuing her work for the Eye Bank of Canada (Ontario Division). Since 1956, when the Eye Bank first started, 1,251 eyes have been donated. Of these, 579 have been used for corneal grafting and vitreous implantation, having first been examined and processed in the Eye Bank Laboratory in the Banting Institute under the supervision of Dr. Basu.

The Corneal Clinic continues to operate once every month in the Toronto General Hospital under the direction of Dr. G. A. Thompson with the collaboration of Dr. C. McCulloch, Dr. P. K. Basu, and Dr. W. P. Callahan.

Under a Medical Research Council grant awarded to Dr. Basu, Dr. I. Drysdale, with the co-operation of Dr. A. G. Gornall of the Department of Pathological Chemistry, is conducting an investigation on the intraocular penetration of steroids using autoradiographic techniques. Results obtained so far this year indicate that

some of the subconjunctivally administered drug gets into the inner layers (choroid and retina) of the posterior part of the eye by diffusing through the sclera beneath the depot of injected drug.

Dr. Basu has been awarded a new Medical Research Council grant for conducting a study on the protein metabolism of the cornea.

Dr. R. C. French and Mrs. Z. Duma have been tracing the uptake of amino acids into the proteins of the cornea. They have found that the presence of epithelium does not affect this synthesis, which indicates the necessity of a revaluation of the metabolism of the cornea. This work has been supported by a National Health Grant and aided by the Medical Research Grant to Dr. Basu.

With the aid of a Defence Research Board Grant Dr. J. J. Kazdan has worked with Mr. J. Foley of the Defence Medical Research Laboratories on sensory interactions. Their findings indicate a complex system must be present, the practical use of which is not yet clear.

Under a National Health Grant, "Clinical Investigation of Idiopathic Retinal Detachment," Dr. M. Shea has directed a Retina Clinic at St. Michael's Hospital and Dr. C. B. Mortimer a similar clinic at the Toronto General Hospital. With the aid of Dr. W. Rombough several aspects of the treatment of retinal detachment have been advanced. Heat generated at the retina by diathermy and photocoagulation is being studied. The effect of freezing on specific ocular tissues is being followed. The reaction of the eye to silicone 200 and its value in retinal detachment is being determined. Advanced design for the photocoagulator, the use of fibre optics, and Laser sources are being investigated. Besides the laboratory work, in certain areas corresponding clinical series are being studied.

The National Health Grant for "Studies on the Prevention and Treatment of Ocular Complications of Diabetes" was continued under the direction of Dr. H. R. Hausler. This is jointly undertaken with the Department of Physiology. A breed of Chinese hamster has been developed which spontaneously develops diabetes and in which diabetic retinopathy can be produced. This would seem to be the first laboratory model of the disease and, if confirmed, will be of great aid in studying this cause of blindness. Dr. Hausler with Dr. Sibay has been investigating the detailed pathology of the disease in the retina vessels and the metabolic changes which produce breakdown of the normal anatomy. Dr. Hausler has also been running a clinic devoted to diabetic retinopathy at the Toronto Western Hospital.

The National Health Grant for "Prevention of Blindness from Glaucoma" was continued under the direction of Dr. J. S. Speakman. Dr. W. R. F. Luke continues to share in this grant and to contribute to the work. Dr. Speakman has run a Glaucoma Clinic at the Toronto General Hospital and has collected groups of cases showing special causes for raised ocular pressure. These causes include: deposition of pigment in the drainage channels of the eye, rupture by trauma through the region of the drainage channels, collagen degeneration in the region of drainage and adhesions in the same area with pupillary change. He has advocated medical management and more conservative treatment of acute glaucoma, which has changed our handling of these cases. He has been able to follow his cases by photography of the angle of the anterior chamber of the eye. With the aid of Dr. T. S. Leeson of the Department of Anatomy, he has continued his detailed study of the pathologic changes occurring in the drainage canals of the eye. Miss Susan Hennighausen has continued tonography in the Glaucoma Laboratory and also runs the Tonometer Testing Station. She has taught other technicians the procedure, which is now being done at Sunnybrook and the Toronto Western Hospital. Dr. R. K. MacDonald has been studying the vessels coming from the angle of the anterior chamber. He has also developed a silicone seton to assist drainage from the eye and has given this a limited clinical trial. He is developing a method of exchanging aqueous without disturbing the fine reflex mechanisms of the eye.

Under an Atkinson Foundation grant Dr. D'Arcy MacDonald has extended

his work on scleral contact lenses to restore vision to those having certain corneal diseases and has extended this work to include corneal contact lenses. This work is done at a special contact lens clinic at the Toronto Western Hospital.

Besides the formally supported work the staff have extended their studies in a number of fields. Dr. J. C. Hill with Dr. H. L. R. Wiebe has studied the lacrimal drainage system in detail. With Dr. J. F. Morgan they have developed a method of roentgenologic study of the system. They have also studied silicone 200 as a lubricant for sockets. Dr. M. Shusterman has been studying retinal detachment in children and intraocular lenses for aphakia. Dr. J. S. Crawford has carried on his work on ptosis at the Hospital for Sick Children and has continued the orthoptic clinic at the Toronto General Hospital. Dr. L. A. Lloyd has further developed the field of neuro-ophthalmology, particularly with a special clinic at the Toronto General Hospital. She has been studying the ocular toxic effects of quinine derivatives. Dr. G. A. Thompson has continued his work on the diagnosis of ocular tumours using radio-active phosphorus. Dr. B. Teichman has continued his work on the management of obstruction of the lacrimal drainage system, and directs an orthoptic clinic at the Toronto Western Hospital. Dr. W. P. Callahan has been studying the surgical approach to orbital tumours and has continued his interest in loss of sight due to squint. Dr. C. B. Mortimer has become an authority on photocoagulation, particularly for Eales' disease. Dr. J. C. Hill and Dr. J. F. Morgan have been using Thiotepa to reduce the incidence of recurrence of pterygium. Dr. W. G. Hutchison has analysed the sequence of events after a localized vascular occlusion in the retina. Dr. Clement McCulloch has collected groups of cases of different forms of uveitis.

Publications

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OTOLARYNGOLOGY

Under the direction of Professor P. E. Ireland

The graduate teaching programme of the Department of Otolaryngology has been considerably improved during the past year as a result of a careful revision of the timetable. There has been an effort to have the graduate students take more part in the teaching by arranging seminars under a staff physician who will assign subjects to be presented by one or two individuals in the course. This was followed by a discussion of the subject. In a relatively small group of twelve students this has proved a most excellent way of having the student take part in the presentation of any particular subject. We have also established a regular Journal Club with the presentation of the newer aspects of the literature. A final year student is expected to produce a paper and some of these papers have been presented by the senior resident at national society meetings here and in the United States. This gives the graduate student an opportunity to have a start at least on a clinical or research problem which may lead him to further interest in this type of experience. The undergraduate teaching has remained the same as in the previous year save that the lecture schedule has been revised. It is felt by this Department that a general revision of teaching is probably imminent and we are quite willing to lend our support in any changes which the committee now making this study will propose.

It was reported from this Department last year that we were making a brave attempt to establish a research centre in our specialty. There is still a great difficulty because of the overcrowding experienced by everyone in the Banting Institute. This is a general problem throughout the medical school, however, and one feels that vigorous efforts on the part of everyone are now leading toward some solution. We have been most fortunate in the continuance of the M.R.C. Grant for the support of Dr. J. Farkashidy and of that from the Alcohol Foundation to Dr. Yuichi Nito. Both these people have produced papers which are related to problems in our specialty and have presented and published papers in various medical journals. We have also received a generous grant from Defence Research through the Department of Physiology for the half-time employment of Dr. David Briant in research problems of the ear. Dr. Briant worked in research in the Department of Physiology and our Department before going to England for one year with an appointment at the Ferens Institute in London, England.

We had, last year, Professor Gosta Dohlman of Lund, Sweden, in our laboratories as a Visiting Scientist for the Medical Research Council. A paper on his work was presented in Athens, Greece, during the year. Through the generosity of the National Institutes of Health we have received a generous grant for his return to Canada and he has been working under this grant to our Department in Stockholm and will return here during the summer months to continue this work. Again I might point out that so many of these grants do not include money for capital expenditures for equipment which is one of the difficulties encountered by most departments. As we make extensive use of the electron microscope we are most grateful that the Faculty has been able to arrange for the purchase and installation of an additional group of these expensive pieces of apparatus, which will soon be available to the many people wishing to use them.

The Department of Otolaryngology has continued to support the course in Speech Pathology and Audiology in the Division of Audiology. The Audiological Department has been established in the Toronto General Hospital with excellent equipment, with a graduate audiologist in charge and a technician. A large centre is presently being established with the latest equipment for the testing of vestibular responses; it will also be attached to the Toronto General Hospital.

The vestibular unit at St. Michael's Hospital continues under the direction of Dr. Walter Johnson of this Department and the Department of Defence Research Medical Laboratories. The clinical work at St. Michael's Hospital is undertaken under a health

grant and is supervised by Dr. Elizabeth McKee. The project has just been completed in this area for the testing of drugs which have been used for the control of vertigo.

In the broad field of disorientation we are grateful for our connection with Defence Research Medical Laboratories where, in collaboration with Dr. J. W. Scott of the Department of Physiology and Dr. Brydon Smith of our own Department, some of the most complete research on disorientation has been progressing. We are proud that this includes an association with Project Mercury, the Space Administration of the United States, and perhaps in some way we have added to this programme. This project includes, as well as the consideration of the vestibular problems, the important subject of high intensity noise. In experimental work on monkey and cats we have had all the pathological sections of the temporal bones completed in our Temporal Bone Laboratory at the Banting Institute. This portion of our laboratory is also supported by a grant from Defence Medical Research Board.

A very generous gift was received from Mr. E. C. Fox to be used to establish the methods of testing the hearing of infants and young children. This project has been progressing in conjunction with the Department of Physiology under Dr. John Scott and Dr. Wilf Goodman. Experimental problems which involve the use of analog computers are under the direction of Dr. Shirley Appleby.

The work at the Institute of Radiotherapy has been under the supervision of Dr. D. P. Bryce. A most extensive survey was done of the type of patients who have been treated by surgery or radiation in the University hospitals and at Sunnybrook Veterans Hospital by Dr. Bryce. The results were presented at a recent meeting in the United States. Many members of our staff take part in activities of various meetings where there is not necessarily any publication of papers. Dr. Page Statten of the Hearing Clinic at the Hospital for Sick Children has been appointed as consultant for the Ontario Crippled Children's Centre. He was also appointed to the World Committee on Speech and Hearing for the International Society for Rehabilitation of the Disabled and, in addition, was elected as a director of the Canadian Hearing Society. He attended the Workshop of Medical Audiology held at the University of Colorado School of Medicine. Dr. G. Arnold Henry attended the Oto-Rhino-Laryngologicum Meeting in Athens, Greece, and took part in the programme. He was also on the programme of the Sectional Meeting of the American College of Surgeons held in Toronto. Dr. J. A. Sullivan who is, unofficially, still a member of our Department, was the President of the American Otological Society this year and presented two papers at the Chicago Workshop (in February) on hearing and hearing disorders. He is also presenting a paper for the First British Academic Conference in Otolaryngology during the month of June. During the past year Senator Sullivan has been made an Honorary Fellow of the Canadian Otolaryngological Society and an Honorary Fellow of the Royal Society of Medicine of England. Dr. W. S. Goodman attended the meeting on Neurological Aspects of Auditory and Vestibular Disorders, which was held in Houston, Texas. He also visited the Institute for the Deaf in St. Louis, the Institute of Speech Disorders in New York, and the Department of Otolaryngology in the University of Missouri at Columbia, Missouri. At the recent combined meetings in Hollywood, Florida, three papers were presented from our Department: one by Dr. Ireland and Dr. Farkashidy, the second by Dr. Blair Fearon, and the third by Dr. Brydon Smith. The meeting of the Canadian Otolaryngological Society was held in June, 1963, in Toronto under the presidency of Dr. P. E. Ireland. A number of papers were presented by members of this Department. The First British Academic Conference in Otolaryngology, held this June in London, England, was attended by Drs. Fee, Goodman, Johnson, and Sullivan. Papers were presented by Dr. Sullivan and Dr. Johnson.

We are most fortunate in the return of Dr. T. D. R. Briant who spent a year at the Ferens Research Institute and Middlesex Hospital in London and who is continuing full time on our staff. He will spend half his time in research in conjunction with the Department of Physiology and half his time in clinical and teaching duties.

The Head of the Department wishes to thank all the Staff for the co-operation he has received during the past academic year. It is only through their support that we are able to feel that an improvement is being made in all branches of our teaching and research each year. We also extend our gratitude to the Research Fellows and technical staff and to our secretaries who are associated in all the details of administration.

Research

We have changed our statement of last year that "we are making a brave attempt to establish a research centre in our specialty." In truth, a research centre has been established. There is still a difficulty in that this work is not centralized and we are now using the facilities of the Defence Research Medical Laboratories, the Banting Institute, the Vestibular Centres at St. Michael's and the Toronto General Hospital, the Department of Physiology, and various other, widely separated units. Along with many other departments we hope that much of our research can be integrated in a common area eventually.

Dr. Walter Johnson continues as our key man in co-ordination of research and he is still also attached to the Department of Physiology. We must most gratefully acknowledge the help that we have had from Physiology especially from Dr. John Scott. Much of the work that is being done and has been accomplished requires the technical skill which we have received from Dr. Scott's Department both in the Toronto General Hospital and in the Best Institute. Dr. Joseph Farkashidy is continuing, under a renewed Medical Research Council Grant, with his studies of the organ of Corti and peripheral vestibular receptors. Much of this work is done with the aid of the electron microscope and we are most grateful that there will be more of these available in order that more time and suitable hours can be maintained. The work that has been done by Dr. Farkashidy has received wide acclaim and he has had papers presented at the Fifth International Congress for Electron Microscopy in Philadelphia, at the annual meeting of the American Academy in Las Vegas, and at the meeting of the Triological Society in Pittsburgh. He has also been a guest speaker at the Chicago Otolaryngological Society and was associated with Dr. Dohlman in the presentation of a paper in Europe. He will be working also with Dr. Dohlman on further research problems being undertaken. Dr. T. D. R. Briant has returned from a year of research in the Ferens Institute in London, England, and is now working under a Defence Research Grant on the neurophysiology of the vestibular and cochlear nerve in the laboratory of Dr. John Scott in the Best Institute.

Under the assistance of a generous grant from the National Institutes of Health, Washington, we are again to have Professor G. F. Dohlman of Lund, Sweden, working in our laboratories. His research will be on "the aspects of labyrinthine physiology" studied by the use of radioactive tracer techniques combined with electron microscopy, secretion and absorption of endolymph the regeneration of the vestibular crista after experimental removal of the cupula, and the localization of peripheral cholinergic nerve endings. The eighth nerve receptors are amongst those subjects which will be investigated. The paper on this work was given at the Collegium in Athens, Greece, last year by Professor Dohlman associated with Dr. Ken Money of Defence Research. On his return to Sweden Dr. Dohlman continued this project at the Karolinska Sjukhuset in Stockholm, under the auspices of this Department with a United States grant. He will return to work in our laboratories for the next three years sometime this summer.

Dr. Yuichi Nito from Osaka, Japan, continues the work on alcohol research under the grant from the Alcoholism Research Foundation. A paper ready for publication has been quite acceptable to the scientific group of this Foundation. He is now continuing work on the effect of alcohol on the intracranial structures central to the vestibular apparatus by histochemical and pathological methods.

The work of Dr. Walter Johnson continues at the Defence Research Medical Laboratories and St. Michael's Hospital. This research remains associated with the

space programme of the United States and Dr. Johnson has been in consultation with the working group with regard to man's orientation and space flights. Along with Dr. Brydon Smith of our Department he has presented a paper at the recent meeting of the Otological Society in Florida. Dr. Elizabeth McKee works under Dr. Johnson's direction in the clinical investigation of vertigo at St. Michael's Hospital. Certain drugs that have special value in suppressing labyrinthine stimulation have been tested using both animals and people. A paper is prepared, but not yet published, on this investigation.

The new research project which was financed through the generosity of Mr. E. C. Fox of Toronto is progressing quite satisfactorily. The first part, now completed, was an attempt to isolate the virus of German measles, which is an agent in the development of congenital deaf mute children whose mother has had measles during her pregnancy. This step of the research was conducted under Professor Rhodes and it is felt that a vaccine can now be prepared for rubella. The second part of the project, being done under the direction of Dr. John Scott and Dr. Wilf Goodman, is an attempt to find some means of assessing deafness and diminished hearing in small children. The main method of assessment is electro-encephalography and progress has been very satisfactory. At the present time animal experimentation is being conducted to confirm the clinical findings. A third part of this research project is a five-year pilot scheme to attempt to produce speech in these deaf or very hard of hearing children. Up to now there has been no official training previous to three years of age, which is felt to be too late in the life of such a child. This pilot scheme is under the sponsorship of the Atkinson Foundation and is being conducted at the Hospital for Sick Children under Dr. J. B. Whaley and Dr. Page Statton. Other investigations on hearing problems in children are also conducted by this clinic.

Dr. Douglas Bell continues his research on allergy at the Toronto Western Hospital along with the Department of Medicine and the Division of Allergy. At the Toronto General Hospital Dr. H. O. Barber is continuing his investigation of the vestibular problems which are related to special diagnoses and treatment in head injuries and neurosurgical problems. A rather expensive but complete unit for vestibular tests is being presently constructed. In conjunction with Miss Sylvia Topp, Dr. Barber has also conducted a research study on the effect of recruitment on hearing. With the help of Professor Moody of the new Institute of Biomedical Electronics a system of coding of hearing records for analysis by computers has been developed. A thousand patients have been analysed by this method with reports in the process of preparation.

Publications

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IRELAND, P. E. "Graduate Training in Otolaryngology in Canada" (*Proceedings of the Canadian Otolaryngological Society*, vol. 16, 1962, pp. 46–51).
IRELAND, P. E. and FARKASHIDY, J. "Electron Microscopic Studies of Meniere's Disease: Twelve Fresh Specimens taken at Operation" (*Transactions of the American Academy of Ophthalmology and Otolaryngology*, vol. 67, no. 1, Jan.-Feb., 1963, pp. 28–36).
JOHNSON, W. H. *et. al.* "Effects of Labyrinthectomy on Canal Sickness in Squirrel Monkey" (*Annals of Otology, Rhinology and Laryngology*, vol. 71, no. 2, June, 1962, pp. 289–98).
MOLONY, T. J. "Subacute Thyroiditis" (*Proceedings of the Canadian Otolaryngological Society*, vol. 16, 1962, pp. 67–73).
SULLIVAN, J. A. "Panel Discussion: Tympanoplasty" (*Transactions of the American Academy of Ophthalmology and Otolaryngology*, vol. 66, no. 4, July-Aug., 1962, pp. 439–70).

PAEDIATRICS

Under the direction of Professor A. L. Chute

Preliminary steps towards the integration of private patients into the teaching programme have been undertaken. This has been accomplished in part by the geographic inclusion of private patients into the teaching areas. The next step not yet completed is the total integration of these patients into a clinic type of organization with group rather than private control.

For a number of years insurance funds available for the professional care of ward patients have been placed in a paediatric staff fund. This year the staff decided to use the fund to assist a sister department in the University of the West Indies. Previously this university had been receiving support from University College Hospital in London but this support had recently been withdrawn. Dr. J. D. Bailey of our staff spent two months there teaching and assuming ward responsibilities. He was assisted in rotation by Dr. C. E. Snelling, Dr. Andrew Sass-Kortsak, and Dr. J. McKee at two-week intervals. It is anticipated that in turn Dr. Back, the Chief of Paediatric Service in Jamaica, will spend some time at the Hospital for Sick Children in the fall of this year. Future plans envisage that this type of staff exchange may be continued over some years and that some of the recent graduates from Jamaica will be assisted to receive training in paediatrics in our hospital.

Dr. P. D. McClure will be returning to our staff in October after a year's study in haematology in London. Dr. J. R. Hamilton, who was the first recipient of the Anna Bradbury Springer Award for the study of gastro-intestinal diseases, is also returning from Birmingham in England and will occupy the post of Chief Resident in the coming year. Dr. J. L. Weber has been appointed Consultant to the Paediatric Division, Ontario Hospital, Thistletown. Dr. John Ross, for many years the Chief of our Allergy Department, is retiring this year.

The members of the staff have been in demand across the country and beyond its borders to give lectures and take part in symposia. A few of the more interesting ones are included in the following list. Dr. H. W. BAIN: 7th Postgraduate Course in Obstetrics, Gynaecology & Paediatrics, Regina; London Academy of Medicine, London; P. E. I. Chapter, College of General Practice, Charlottetown; Canadian Medical Association, Winnipeg; College of General Practice, Edmonton; Thunder Bay Medical Society, Thunder Bay; Canadian Paediatric Society, Quebec. Professor A. L. CHUTE: International Congress on Paediatrics, Lisbon; Visiting Professor, University of Alberta, Department of Medicine, Refresher Course. Dr. C. COLLINS-

Williams: Annual meeting of the American College of Allergists, Minneapolis; Annual meeting of the Canadian Academy of Allergy, Alexandria Bay; Dr. J. M. M. Darte: Academy of Medicine, London, Ontario; International Congress of Radiology, Montreal; Canadian Medical Association, Winnipeg.

Dr. J. H. Ebbs: American Academy of Pediatrics, Chicago; American Camping Association, annual meeting, New York City; Ontario Camping Association, Toronto; R. Tait McKenzie Memorial Day Lecture, Almonte, Ontario. Dr. Robert Ehrlich: American Diabetes Association, Atlantic City. Dr. R. S. Fowler: American Pediatric Society, Atlantic City; Ontario Medical Association, Sault Ste. Marie; Dr. D. Fraser: Postgraduate Course, American Academy of Pediatrics, Vancouver; Nutrition & Diet Conference, A.M.A. Council on Foods and Nutrition, New York; International Congress of Paediatrics, Lisbon; Atlantic Nutrition Conference, Halifax. Dr. J. D. Keith: Fourth World Congress in Cardiology, Mexico City; Annual meeting, American Heart Association, Cleveland, Ohio; Canadian Heart Foundation (Canadian Cardiovascular Society) meeting, Quebec City; The H. Milton Rogers Foundation for Heart Research Inc., St. Petersburg, Florida. Dr. J. A. McKee: Peterborough Medical Society, Peterborough.

Dr. D. M. McLean: American Association of Immunologists (Federation of American Societies for Experimental Biology), Atlantic City; Canadian Paediatric Society, London, Ontario; Canadian Public Health Association, Montebello, Quebec; American Academy of Pediatrics, Chicago; Third Refresher Course in Preventive Medicine sponsored by Department of Health Services & Hospital Insurance for British Columbia in association with Faculty of Medicine, University of British Columbia, Vancouver. Dr. J. S. Prichard: Cerebral Palsy Association, Fredericton, N.B.; Canadian Neurology Society, Winnipeg; American Academy of Pediatrics, Chicago. Dr. T. Edward Reed: Cancer Research Institute, San Francisco. Dr. Paul Swyer: Society for Pediatric Research, Atlantic City. Dr. J. A. P. Turner: American Thoracic Society, Denver, Colorado.

Research

Endocrinology. Dr. R. Ehrlich has been studying the levels of blood insulin by the immuno-assay method in diabetics, newborns, and patients with idiopathic hypoglycaemia. Dr. J. D. Bailey and Dr. K. Fullerton have continued their studies on dwarfs and the effects of human growth hormone. Recent expansion of the staff of the Research Institute of the hospital will make it possible to push ahead with increased vigour in these areas.

Metabolic diseases. Dr. Fraser is continuing his studies of calcium and phosphorous homeostasis in children and experimental animals. Dr. Sass-Kortsak is continuing his studies on the fate of copper in the body with special reference to Wilson's disease. He is employing amongst other techniques the use of radioactive isotopes with total body scanning. Dr. Bailey, with the assistance of Dr. Phyllis Hartroft and Dr. Sutherland, has studied twins with a most interesting disorder of the juxtoglomerular apparatus.

Cardiology. Dr. J. D. Keith and Dr. R. Fowler, with the assistance of the Research Institute, are continuing their analyses and studies of a wide variety of congenital and acquired heart lesions in children.

Respiratory. Dr. P. Swyer has been studying the respiratory and metabolic disorders of newborns. Correction of the metabolic acidosis coupled with assisted respiration has given some promising results in severely affected children.

Allergy. Dr. C. Collins-Williams has continued his studies on milk allergy in children.

Genito-urinary. Dr. C. P. Rance assisted by Dr. P. Conen of the Research Institute has been studying renal biopsy material in various renal disorders by both light and electron microscopy. Dr. J. B. J. McKendry is pursuing his study in eneuresis.

Virology. Dr. D. McLean continues to follow the various outbreaks of viral disease as presented in the hospital. Recently he has been assessing the value of mumps vaccine in protecting adult contacts from developing the disease.

Publications

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——— "Hemagglutination Studies in Ragweed Sensitive Asthmatic Children" (*Annals of Allergy*, vol. 20, no. 7, July, 1962, pp. 486–90).
Fowler, R. S. "Salicylates in the Treatment of Acute Rheumatic Fever" (*Applied Therapeutics*, vol. 5, March, 1963, pp. 241–6).
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PATHOLOGICAL CHEMISTRY

Under the direction of Professor James A. Dauphinee

During the 1962–63 session the 132 students in the third year of their medical course and a number of graduate students attended the lectures, laboratory classes, and seminars given in the course in General Pathological Chemistry. Some 15 graduate students were registered in the Department as candidates for higher degrees. Of these, three were taking the B.Sc.(Med.) degree (two as summer students), four were working for the Master of Arts, and eight were proceeding to the Ph.D. Among the latter Dr. Barry A. Tobe completed his thesis entitled "The Metabolism of the Volatile Amines with Particular Reference to Diseases of the Liver" and was awarded his degree at the spring convocation of the University.

No essential changes have been made in the undergraduate course, which has been described in previous reports, except that the order of subject presentation was altered to some degree in order to bring about a closer correlation between the work of the students in this Department and their work on the wards of the hospital. In the advanced course on Pathological Chemistry, given to graduate students, emphasis was placed on new concepts and recent developments in the subject and the part these have played in the improved understanding of such human diseases as hypertension, inborn errors of metabolism, the various endocrinopathies, connective tissue disturbances, and other metabolic ailments. Increased emphasis was also placed on the possible role of various immunochemical reactions in the aetiology of disease and on the increasing usefulness of radioactive isotopes and other new tools in the investigation of the human patient.

In January, 1963, Professor T. Frederick Nicholson was given leave of absence from the University on being invited to go to Nigeria to become the Professor of Pathology and Head of the Department in the new medical school at Lagos. It was a high honour to have been chosen for this post and Professor Nicholson, with his wide experience first in pathology and then in pathological chemistry and clinical pathology, is particularly well qualified to take on this very responsible position.

During the course of the year we enjoyed a visit by Dr. Jorgen Clausen, Associate Professor at the Biochemistry Institute of the University of Copenhagen, who delivered, under the auspices of the School of Graduate Studies, three well-attended lectures on the following subjects: (1) "The Theory of Immuno-electrophoresis and its Clinical and Biological Application"; (2) "Excretion of Acid Muco-polysaccharides in Urine from Patients with Hurler's Syndrome, Morquio-Ullrich's Disease, and in Mastocytoma"; and (3) "Agar-gel Electrophoresis and Enzymo-electrophoresis and their Biological Applications." We have also been privileged to have a visit from Dr. Arthur S. McFarlane of the National Institute of Medical Research, Mill Hill, London, who gave a special lecture under the auspices of the Division of Postgraduate Medical Education entitled "The Hepatic Synthesis of Proteins."

The support of the Medical Research Council, the Ontario Heart Foundation, and the Ontario Cancer Treatment and Research Foundation who have generously supplied funds in aid of a number of our research projects is most gratefully acknowledged.

Research

Reported by Professor James A. Dauphinee

Dr. Dauphinee and Mr. C. E. Downs have collaborated with Dr. J. C. Richardson of the Neurological Staff of the Toronto General Hospital in the investigation of the copper metabolism and of the effect of the administration of the chelating agent dl penicillamine on the urinary excretion of copper and other trace metals in a number of patients suspected to have Wilson's disease. They have also continued their studies on liver function and serum enzyme abnormalities in patients with cirrhosis and other hepatic diseases, paying particular attention to an attempt to develop a reliable method for the determination of serum arginase. With the help of Dr. Elizabeth Kruyff of Sunnybrook Hospital a study has been carried out to investigate the alleged beneficial and serum albumin-raising effect of tolbutamide when this drug is administered over a prolonged period to patients with cirrhosis of the liver and ascites.

Miss Amy Britton, working with Drs. Volpé, Ezrin, and Johnston of the Department of Medicine and using I^{131} labelled thyroxine and starch gel electrophoresis, has continued her investigations of the factors which influence the binding and carrying of this hormone by different fractions of the serum proteins. The capacity to bind added thyroxine is used as an indirect measure of the amount of binding protein present in the serum. Saturation curves have indicated that normally about 22 μg. thyroxine can be bound by the thyroid-binding globulin (TBG) in 100 ml. serum and that about 50 μg. will be bound to the pre-albumin binding protein fraction (TBPA).

Miss Margaret S. DeWolfe, working with Dr. S. H. Jackson of the Hospital for Sick Children, has extended her study of the serum slow α_2 macroglobulin to an investigation of the rate and extent of its increase in the serum of rats in which the nephrotic syndrome has been produced by the injection of rat anti-kidney serum or by the administration of the amino nucleoside of Puromycin [6-dimethyl amino-9-(3^1-amino-3^1 deoxy-D-ribofuranosyl-purine)]. She has found that in both cases this serum protein fraction increases markedly and that the changes coincided with the appearance of the proteinuria and the decrease in serum albumin resulting from the nephrotic syndrome producing agents. Miss F. Brown, also working with Dr. Jackson, has been studying the urinary proteins in nephrosis and nephritis with particular reference to their molecular size as determined by chromatography on different Sephadex columns.

Dr. Andrew Baines, who was working under the direction of Professor Nicholson before the latter went to Nigeria, has been studying the return of function in kidneys in which the tubules have previously been damaged by the administration of nephrotoxic compounds. He is attempting to correlate the ability of the kidney to

perform certain functions (such as inulin and para-amino hippurate clearance and maximum tubular glucose reabsorption) with the morphological changes and with alterations in the distribution of certain enzymes within the kidney as a whole and within the individual renal cells.

Mr. L. A. Wright, also one of Professor Nicholson's graduate students, has been studying the handling of amino acids and other ninhydrin-positive substances by the kidney in dogs under normal conditions and in situations in which various portions of the renal tubules have been specifically damaged by toxic agents. He has found that a combination of the techniques of high voltage electrophoresis and the Hane's system of paper chromotography has functioned very well for the separation of the many substances of this nature which are excreted by the kidney. His work has resulted in the identification in the urine of his animals of some unusual amino acids and of certain peptides, and he is examining the possibility that such peptides may be synthesized in the kidney and also that under certain pathological circumstances they may be broken down by their passages through this organ. Mr. B. F. Sakran has been developing the use of these techniques for the purpose of examining the urinary excretion of ninhydrin-positive substance in patients with Wilson's disease and in other human conditions in which amino aciduria is known to occur.

Working with Dr. W. K. Kerr of the Department of Surgery and with Dr. Nicholson, Dr. Martin Barkin has shown that the parathyroid hormone, parathormone, increases the clearance of phosphate by the isolated kidney and that this phosphaturic effect is due to a direct influence on the tubular handling of phosphate rather than to an indirect tubular response to an increased filtered load.

Reported by Professor A. G. Gornall

In the Fellows' laboratory Dr. Velta Cernavskis has continued her study of the plasma protein fractions that bind hydrocortisone and is attempting to elucidate their significance. A related effect of steroids on the mechanism of blood clotting is also under scrutiny. Mr. D. Ostrovsky has recorded the blood pressure responses to renin and angiotension in rats treated with various steroid hormones and has found that aldosterone diminishes the pressor response to single injections of these substances. Miss B. J. Grange is utilizing radio-isotope techniques and autoradiography in an attempt to trace the fate of injected aldosterone. Dr. D. J. McDonald has modified and tested a method for the determination of angioten-sinogen in plasma and has initiated a study of factors that influence the level of this substance. Mr. M. King, in the first of three summers as a candidate for the B.Sc.(Med.) degree, has explored different methods of producing hypertension experimentally in rats.

Dr. S. L. Cohen has completed a study of factors potentiating hydrolysis of pregnanediol glucuronidate by glucuronidase. In May of this year he joined the staff of the Department of Obstetrics and Gynaecology but he will continue to retain an active association with our Department.

In the Steriod Hormone Laboratory Mrs. M. Kandel has been responsible for isotope measurements and the estimation of aldosterone secretion rates. Mrs. E. Anderson has carried out the paper chromatographic isolation of aldosterone and and is conducting aldosterone secretion studies in hypertensive dogs. Mr. M. Luke explored the possibilities of thin-layer chromatography of aldosterone. Mrs. M. Cohen has prepared and purified urine extracts for aldosterone determinations.

In the Clinical Investigation Laboratory a variety of analytical procedures have been carried out by Mrs. H. Pavuls and Mrs. E. Kuhn in connection with different research projects.

Dr. I. O. Drysdale of the Department of Ophthalmology has been assisted with an autoradiographic study of intraocular penetration of hydrocortisone following subconjunctival injection.

The following problems have been under study during the year in collaboration with clinical departments: (1) aldosterone secretion and excretion in patients with hypertension of various types with Dr. J. C. Laidlaw and other colleagues in the Department of Medicine; (2) the effects of the progestational agent (BDH-1298) in normal and amenorrhoeic women and patients with endometriosis—with Drs. T. A. Doran and J. L. Harkins, Department of Obstetrics and Gynaecology.

Reported by Professor W. Paul

Research into different methods for the measurement of the ultimate distribution in the body of radioactive nuclides, administered for diagnostic purposes, was continued this year in the biophysical division of the Department with financial assistance from the Ontario Cancer Treatment and Research Foundation. The development of mechanical scanning systems, one of which is now being used routinely for brain scanning in the Toronto General Hospital, has been discontinued, and research into the use of the "camera" type of distribution measurement has been commenced. The present study has been undertaken in an effort to utilize the potential theoretical advantage of very large crystal detectors which up to now seem to have exhibited poor resolution and efficiency. In addition, a co-operative study into the electronics of the "camera" detectors has been undertaken in collaboration with Professor N. F. Moody of the Institute of Biomedical Electronics.

A new experimental ear oximeter using conventional operational amplifiers was completed during the year and this instrument is currently being studied in the Cardio-Respiratory Unit of the Toronto General Hospital.

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PATHOLOGY

Under the direction of Professor A. C. Ritchie

During the past year, the method of teaching special pathology to the medical students has been somewhat modified. Previously, the lecture course was given entirely in the latter part of the second medical year. This caused two difficulties. The time available was short but, more important, the course was given at a time when the students had very little clinical knowledge. They were therefore unable to appreciate properly the relevance and importance of their studies to the practice of medicine. The lecture course has therefore been extended to begin in the second medical year and to continue throughout the third medical year. In addition, more stress has been placed on group teaching in the second medical year.

The extension of formal instruction in Pathology into the third medical year makes still more illogical the final examination in pathology at the end of the second medical year. This examination is indeed given before the course has been completed. Also, an examination at the end of the third medical year might be more valuable to the students as they would then have a better opportunity to correlate their pathological and clinical studies.

The undergraduate courses in General Pathology for dental students, and the courses for students of Physiotherapy were continued as in past years.

The load of graduate teaching remains heavy and is likely to increase. The staff assisted in the work of the Division of Postgraduate Medical Education, giving instruction in pathology both to those training in clinical work and to those training in pathology. In collaboration with the Department of Pathological Chemistry, the courses of instruction given to residents training in pathology have been expanded, and it is hoped that this expansion will continue. Members of the staff have also participated in the courses arranged by the Canadian School of Embalming and by the Toronto Institute for Pastoral Training.

It becomes ever more clear that more staff is needed if the various courses of instruction offered by the Department are to be developed and extended as they should and could be. The load of teaching and routine work is already such that the majority of senior members of the Department find it difficult to give time to the investigative work which should be an important function of the Department. The major barrier to the enlargement of the staff continues to be lack of space. Full-time additions to the senior staff of the Department in the Banting Institute are urgently needed, but the Department is already overcrowded and there is nowhere such extra men could be placed. In addition, the facilities provided by the Department for Autopsy Service of the Toronto General Hospital become ever more antiquated and ever more inadequate. A new Autopsy Suite is urgently needed to permit the Department to work efficiently, and to develop its potential for teaching and research.

Several members of the Department spoke to academic or scientific bodies. In many cases, the papers presented were prepared in collaboration with other members of the Department. Dr. RITCHIE lectured on neoplasia at McGill University; spoke on the "Duplication of Desoxyribonucleic Acid and Epidermal Carcinogenesis" at the Eighth International Cancer Congress in Moscow; on the "Histopathology of Cutaneous Malignancy" to the Canadian Dermatological Association; and served as moderator at a slide seminar given at the meeting of the Canadian Cytology Council. Dr. MOVAT delivered a referat on "Antigen-Antikörpenkomplexe und allergische Entzündung" in Dortmund at the invitation of the Deutsche Gesellschaft für Pathologie; spoke on "The Earliest Changes in Acute Normergic and Allergic Inflammation" to the International Academy of Pathology in Zurich; on "The Earliest Changes in Acute Normergic and Allergic Inflammation" and on "Maturation of Plasma Cells after Antigenic Stimulation" at the Fifth International Congress for Electron Microscopy in Philadelphia; on "Is There any Alteration of Collagen Fibrils at Sites of Antigen-Antibody Interaction?" to the American Association of Pathologists and Bacteriologists in Cincinnati; and on "Studies of Allergic Inflammation" to the Canadian Association of Pathologists in Toronto. Dr. STEINER lectured at the Kansas University School of Medicine on "An Introduction to Ultrastructural Pathology" and on "The Ductular Cell Reaction of the Liver"; and at Western Reserve University School of Medicine, Cleveland, on "The Normal and Pathologic Ultrastructure of Cells," and on "Mechanisms of Obstructive Jaundice Studied in the Electron Miscroscope." He presented papers to the American Association of Pathologists and Bacteriologists in Cincinnati on "The Ultrastructure of the Ductular Cell Reaction of the Liver"; to the Ontario Association of Pathologists in Kingston on the "Ultrastructure of the Biliary Epithelial Cell"; to the Canadian Association of Allergists in Toronto on the "Graft-versus-Host Reaction and the Concept of Autodestruction"; and to

the Canadian Association of Gastroenterologists in Toronto on "The Pathogenesis of Obstructive Jaundice." Dr. DONOHUE gave a slide seminar at the meeting of the Ontario Association of Pathologists in Kingston. Dr. T. C. BROWN addressed the Ontario Cancer Foundation Conference in Ottawa on "Cancer of the Lip." Dr. M. J. PHILLIPS gave a paper on "Small Cell Carcinoma of the Thyroid" to the Ontario Association of Pathologists in Kingston. Dr. YOUNG addressed the Second North American Conference of Medical Laboratory Technologists in Washington, D.C. on "Quality Control"; and spoke on this same topic to the University of Western Ontario in London, and to the Section of Clinical Pathology of the Ontario Medical Association in Windsor. Dr. CONEN spoke on "A Mosaic Normal "D" Trisomy Boy with a Radiation Chimera Father" to the American Association of Pathologists and Bacteriologists in Cincinnati; on "Light and Electron Microscopic Studies of 'Myogranules' in a Child with Hypotonia" to the Society for Pediatric Research in Atlantic City; on "*In Vivo* Studies of the Chromosome Constitution of Human Tumours" to the Royal College of Physicians and Surgeons of Canada at Edmonton; on "Chromosome Patterns of Human Malignant Tumours and Effusions" to the American Association of Cancer Research at Toronto; on "Chromosome Studies in Malignant Disease" to the Canadian Cytology Council in Toronto; and on "Chromosome and Sex Chromatin Studies in 3 Intersex Infants" to the Canadian Paediatric Society in Ste. Adele. Several members of the Department gave short courses at the meeting of the Canadian Association of Pathologists, Dr. DONOHUE on "Liver Disease in Infants and Children," Dr. Ross on "Liver Biopsy," Dr. PRITZKER on "The Use and Importance of Certain Advanced Methods in Urinalysis," Dr. THOMPSON on "Application of the Millipore Filter to Cytology," Dr. YOUNG on "Quality Control in and about the Medical Laboratory," and Dr. CONEN on "Techniques of Study of Chromosomes."

Dr. D. M. Young, Director of Laboratories of the Toronto General Hospital, and Dr. J. H. Crookston, Head of that hospital's Division of Haematology, joined the Department. Both are taking a full part in its postgraduate work. Dr. P. Conen of the Hospital for Sick Children and Dr. Alice Grey of the Women's College Hospital joined the part-time staff. Dr. M. J. Phillips leaves the full-time staff, but will join the staff of the Toronto General Hospital and so will remain with us. Dr. A. J. Gelbloom leaves to take up an appointment at the Scarborough General Hospital. Dr. M. C. Patterson, Dr. K. Miyai, and Dr. T. Uriahara joined the staff as Research Fellows. We are particularly glad to welcome the Department of Pathology of the New Mount Sinai Hospital to the group of teaching hospitals. Dr. Pritzker and his staff will add much, and we look forward confidently to a long and fruitful association.

Dr. A. H. Coons of Harvard University spent a day in the Department when in Toronto to receive his Gairdner Award. Professor R. Kourilsky of Paris visited the Department and spoke on the "Mechanism of Hypersensitivity Reactions of the Delayed Type, a Study of Vascular Permeability." Several other distinguished visitors also visited the Department.

Dr. N. V. P. Fernando presented his thesis entitled "An Electronmicroscopic Study of the Earliest Changes in Acute Normergic and Allergic Inflammation" and was awarded the degree of Doctor of Philosophy. Dr. H. Shinozuka presented a thesis entitled "Initiating Stage of Epidermal Carcinogenesis in Mice" to McGill University and was also successful in obtaining the degree of Doctor of Philosophy.

RESEARCH

After very considerable delay, it is hoped that the facilities to permit the installation of new electron microscopes will be completed shortly. This improvement will augment materially the scope of the research work possible.

With Dr. H. Shinozuka, Dr. Ritchie has continued his studies on experimental epidermal carcinogenesis. Evidence has accumulated suggesting that chemical car-

cinogens may affect the reduplication of desoxyribonucleic acid. With Dr. M. Patterson, he has initiated a study of the development of metastases in the mouse's mesentery.

Dr. Movat and Dr. N. V. P. Fernando have continued their studies of allergic inflammation. As a preliminary, they are investigating the fine structure of lymphoid tissue. Work on the changes which occur in spleen and lymph node during antibody formation is in progress. They have also studied the early changes which occur at the blood-tissue barrier in acute inflammation and have compared the changes produced by such stimuli as heat, nitrogen mustard, and turpentine with those which occur in allergic inflammation. The nature of the damage to the vascular wall has been described, and the sites of the antibody-antigen reaction have been determined. In collaboration with Dr. T. Uriahara and Mr. W. J. Weiser, Dr. Movat and Dr. Fernando have demonstrated in the avascular cornea that collagen fibrils are not damaged by an antibody-antigen reaction. The group is now studying the way in which the severe damage associated with the Arthus reaction is produced. Mr. Gerhard Helmel, a second-year medical student, has joined Dr. Movat's group to work for a B.Sc. (Med).

Dr. Steiner, in collaboration with Dr. M. J. Phillips and Dr. K. Miyai, has continued to investigate the changes induced in the liver by hyperplasia-inducing and carcinogenic chemicals. Electron microscopy has revealed details of the alterations produced which throw new light on both hepatic carcinogenesis and on the pathogenesis of human disease. Dr. Phillips and Dr. Steiner have also begun to study the ultrastructural alterations in the liver of patients with hepatic disease. Dr. A. J. Gelbloom and Mr. R. Baumal have co-operated with Dr. Steiner in the study of various problems related to transplantation. They are paying particular attention to the graft *versus* host reaction in the mouse. Dr. Steiner, in collaboration with Drs. M. W. Johnston, C. Ezrin, and R. Volpé, has completed an investigation of the significance of autoantibodies in patients suffering from various thyroid disorders. Miss S. M. Perz, a second-year medical student, has commenced to work for a B.Sc. (Med) under Dr. Steiner's supervision and is studying the relative growth of patterns of liver and biliary epithelial cells.

Dr. Anderson has continued his study of the degenerative changes occurring in the shoulder. He has studied both human and experimental material, in collaboration with Dr. G. Gordon and Dr. R. Moore. Dr. Thompson is completing his study of circulating tumour cells, in collaboration with Dr. N. Delarue and Dr. R. A. Faulk. The findings are now being analysed. He is commencing a study of the value of cytology in the detection of carcinoma of the lung in asymptomatic patients, in collaboration with Dr. Delarue, Dr. F. G. Pearson, and Dr. D. O'Brien. Dr. J. H. Crookston has continued his studies of haemolytic anaemias and myeloproliferative disorders.

In the Hospital for Sick Children, Dr. Donohue, Dr. Sass-Kortsak, and Dr. Conen in co-operation with Dr. J. Weber have studied liver biopsies from children with various forms of liver disease by light and electron microscopy, and have correlated the clinical and morphological findings. Dr. Conen is also studying by light and electron microscopy tissues from animals, with particular emphasis on the changes found in mice with muscular dystrophy. Dr. Sass-Kortsak has investigated the mechanisms by which menadione induces haemolysis in the newborn and has studied peculiarities of the metabolism of red cells in the newborn. He has continued his studies on the metabolism of copper, paying special attention to Wilson's disease. Dr. Conen is continuing his studies of chromosomes, in various malignancies and in leukaemia. In addition chromosomes obtained from cultures of marrow and blood from patients with various congenital malformations are being investigated.

Dr. R. J. MacKay is continuing to collaborate with Professor A. M. Fisher of the School of Hygiene on experimental pneumoconiosis.

Several members of the Department have prepared reports of cases or groups of cases, alone or in conjunction with members of other departments, or have collaborated in research work reported by other departments.

DIVISION OF NEUROPATHOLOGY

Reported by Professor J. Olszewski

Undergraduate teaching consisted of eight lectures for the second medical year and four lectures for the third year. In addition, instruction in the pathology of the nervous system was offered by all members of the Department during laboratory periods. Because of the crowded curriculum, teaching of neuropathology on the undergraduate level is very restricted. On the other hand, we thought that there may exist a small group of undergraduate students interested in neurological sciences but lacking an opportunity for expression and an incentive to broaden their knowledge. To meet this need, we suggested to the undergraduate classes the organization of a neurological science club. As expected, a small but enthusiastic group of students responded to this challenge and we hope that the club will continue to operate in the future years.

On the postgraduate level members of the Division contributed to the courses organized by the Department of Postgraduate Medical Education. In addition, we conducted a weekly clinical pathological conference, monthly discussions on the recent research projects, and a series of tutorials in neurohistology and neurophysiology (Professor J. Scott) for our own research fellows and resident staff. Fortnightly meetings of the Journal Club continued to provide a pleasant social and scientific atmosphere.

Members of the Division participated in various scientific meetings. Professor Olszewski lectured on metabolic and toxic diseases of the nervous system at the neuropathology course organized by the American Academy of Neurology, and on the technique of brain sectioning at the workshop of the Canadian Association of Pathology. Professors J. Olszewski and M. I. Tom and Drs. N. B. Rewcastle, J. Humphrey, J. Francoeur, J. Steele, and C. H. Tator presented papers at the meetings of the American Association of Neuropathologists, American Neurological Association, Canadian Neurological Society, and Canadian Association of Neuropathologists. Professor J. Olszewski was invited to deliver a lecture at a meeting of the Montreal Neurological Society.

We were very pleased to be the host to the third annual meeting of the Canadian Association of Neuropathologists which met in Toronto in June, 1963. Professor M. I. Tom was elected president for 1963–64.

Several distinguished scientists visited our Division. Dr. A. Rothballer, Associate Professor of Neurosurgery and Neuroanatomy from the Albert Einstein College of Medicine, Dr. R. Friede, Chief of the Morphology Division of the Mental Health Research Institute in Ann Arbor, and Dr. Hirano from the National Institute of Health in Bethesda delivered lectures and spent a few days in our laboratory. The financial help of the Division of Postgraduate Medical Education in arranging these visits is gratefully acknowledged.

Research fellows and resident staff worked with exemplary devotion. Dr. N. B. Rewcastle (M.R.C. Research Fellow), after completing his Ph.D. residency requirements, left for one year of study in Germany in the Brain Research Institute in Munich, under M.R.C. Fellowship. Dr. C. H. Tator (M.R.C. Research Fellow) completed his first year of postgraduate work towards a Ph.D. degree. Dr. H. Wisniewski left our Division in January to continue his postgraduate training at the N.I.N.D.B. in Bethesda. Dr. R. Elgie returned to clinical work in January, after having spent one year in neuropathology. Dr. J. Steele completed his year of neuropathological training and returned to clinical work in July. Dr. J. Francoeur joined our Division in January and we are very pleased that he decided to stay with us for the whole 1963–64 academic year. Dr. C. Cortes arrived from Spain in February and is going to continue his training with us during 1963–64.

I would also like to acknowledge with pleasure the exemplary effort of our secretarial and technical staff.

As in previous years, in addition to teaching and research, the third major duty of our Division was in relation to the neuropathological service to the Toronto General Hospital. The relationship of the University and the hospital is rather complex. In our field it can be summarized by saying that the work in neuropathology is supported jointly by the University and the hospital. It is a happy arrangement in which teaching, research, and service imperceptibly merge into one another and could not be separated without destroying the whole unit. The routine service on autopsy and surgical material was carried on mainly by Professor M. I. Tom. As usual, she performed her duties, not only with enthusiasm and zeal but also with profound knowledge which can be gained only by years of thoughtful experience.

The laboratory of muscle pathology, under Dr. J. Humphrey, continued to be a busy and productive operation. Routine histological methods, histochemical techniques, and electron microscopy on human biopsy material and on muscles from experimental animals have been studied. In Dr. C. Ezrin's laboratory for the study of the pituitary, research has been continued with the assistance of graduate student Dr. S. Murray.

The physical setup of the Division was improved slightly by the renovation of one room which serves now as an experimental laboratory, and by providing proper floor covering and lighting in the histological laboratory. We are also happy to report the purchase of an electron microscope which we hope will be in operation in a few months. However it must be stated emphatically that the premises occupied by the Division are highly unsatisfactory in regard to both space and facilities. We hope that the University will be able to proceed swiftly towards the construction of an addition to the Banting Institute.

We gratefully acknowledge the financial help of the Medical Research Council, Department of Public Health, Muscular Dystrophy Society of Canada, and Ontario Cancer Treatment and Research Foundation.

Three summer students, M. Ball, N. Iscove, and G. Growe, worked in the Department during the vacation.

Research

Professor J. Olszewski with Dr. H. Wisniewski continued the study of vascular permeability of the hypothalamus and area postrema, and of retrograde cell changes after lesions to the axons. Professor M. I. Tom, in co-operation with Dr. W. M. Lougheed from the Department of Neurosurgery, studied the pathology of vessels after experimental vascular repair and changes in the central nervous system of dogs after hypothermia. Dr. N. B. Rewcastle investigated cerebral oedema, and, together with Dr. H. Wisniewski, the structure of the choroid plexus. Dr. C. H. Tator, in co-operation with Dr. T. P. Morley, investigated the factors responsible for localization of radioactive isotopes in various cerebral lesions, using extensively autoradiographic technique. Dr. J. Steele, in co-operation with Dr. J. C. Richardson, studied a series of cases presenting a hitherto unrecognized clinicopathological syndrome. Dr. H. Wisniewski studied pathological lesions in the human pituitaries related to cardiovascular disorders or to increased intracranial pressure. Dr. J. Francoeur (with Dr. N. B. Rewcastle) studied the teratomatous cysts occurring in the spinal canal in relation to their sex chromatin pattern.

The following work has been carried on in Dr. C. Ezrin's laboratory: (1) Pituitary cytology. Special stains of the human adenohypophysis have revealed additional basophil cell types. These are separate basophil or chromophobe cells responsible for the production of TSH, FSH, LH, and ACTH. Growth hormone and prolactin appear to be the same substance in humans and arise from the acidophil. A survey of pituitaries from cases of myxoedema and Graves' disease has shown that the B2 cell (presumably the source of TSH) is inhibited in Graves' disease, in contrast to its hyperplastic condition in primary myxoedema. (2) A clinical and pathological review was made of 100 cases of acromegaly. (3) Studies

on a case of Zollinger-Ellison syndrome: diarrhoea caused by non-beta cell islet tumour of the pancreas. In a fatal case due to islet cell carcinoma, extracts of the tumour were shown in dogs to produce marked increase in gastric secretion and acidity. This was the first experimental demonstration that the diarrhoea was secondary to excessive production by the stomach of hydrochloric acid. (4) Diuretic effect of oxytocin. A reverse diurnal excretory rhythm of water, creatinine, and electrolytes was observed in a woman with fluid retention that first appeared following a head injury 21 years previously. Synthetic oxytocin injections were given on the premise that she had a selective deficiency of oxytocin with normal vasopressin production. This treatment produced a diuresis and restored a normal excretory rhythm of water, creatinine, and electrolytes. Inulin and PAH clearance studies showed that oxytocin increased the daytime glomerular filtration rate. These results suggest the possibility that oxytocin has an additional non-obstetrical physiologic function, viz. the regulation of the normal diurnal rhythm of glomerular filtration rate.

Dr. Humphrey, together with Dr. Rewcastle, investigated a case of vacuolar degeneration of skeletal muscle fibers. Attempt has been made to produce myxoedema in animals in order to study muscular changes in this disease, but to date no definite positive results have been obtained.

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PHARMACOLOGY

Under the direction of Professor E. A. Sellers

The primary purpose of the Department is instruction of undergraduates. Over the years this commitment has been extended from instruction of medical students only to students in the Faculties of Dentistry, Pharmacy, and Food Sciences. Compared with the year 1950, the number of students has doubled and the instructor hours have almost tripled. During the same period the number of full-time instructors has been increased by one. It is clear that the expansion of the University has altered the functions of the Department and its requirements of space and personnel. Considerable increases in both are urgent.

Although the primary purpose of a university department may properly be regarded as teaching of undergraduates, other functions (especially in large universities) have been accepted and represent comparable commitments in work load. These are: graduate training (professional), research, continuing postgraduate medical education, service on governmental, national, and international commissions, boards, and committees. The staff of the Department have played active roles in every one of these categories. In each category demands have increased and it has become increasingly apparent that a discrepancy between work load and available personnel exists. To a considerable extent the solution to this problem lies beyond the Department itself—it depends on the character and accepted

functions of the University as a whole. Two courses are open—restriction of activities or considerable increases in space, personnel, and financing. Reaching a decision on which course to follow cannot be delayed too long, in the interest of both students and staff. The results of various investigations into this matter are awaited with concern.

It is with regret that the retirement of Professor G. H. W. Lucas is recorded. With the late Professor V. E. Henderson, he culminated numerous contributions in the field of anaesthesia with the discovery of cyclopropane as a general anaesthetic. Many useful and valuable toxicological indentification procedures were introduced by Professor Lucas, but perhaps more important than these contributions, generations of undergraduate and graduate students will remember his wise and friendly counsel. Fortunately, for the next two years, Professor Lucas will remain on the staff as a special lecturer.

A number of special lecturers including Professor E. Zaimis (London) and A. d'Iorio (Ottawa) visited the Department.

Particular mention should be made of members of the staff of the Laboratory of the Attorney General, the Defence Research Medical Laboratories, and the Food and Drug Directorate for their generous and invaluable help.

Professor E. A. Sellers served as a members of the Special Committee on New Drugs appointed by the Royal College of Physicians and Surgeons of Canada. He also was appointed Chairman of the Standing Committee on Drug Safety of the Pharmacological Society of Canada. At the International Meeting on Temperature Regulation held in Leyden, Professor Sellers was Chairman of a plenary session and with Professor E. Schönbaum was co-chairman of a panel on catecholamines. In addition, Professor Schönbaum presented papers at the Symposium on Hibernation, Helsinki, at the second Scandinavian Pharmacological meeting, Göteborg, and at the State University of Groningen.

Professor G. H. W. Lucas has been appointed to serve as a member at large on the Executive Board of the Committee on Alcohol and Drugs of the National Safety Council of the United States. He was also appointed Chairman of the Programme Committee of the American Academy of Forensic Science and Chairman of the Scientific Session of the Canadian Society of Forensic Science.

Professor W. Kalow has become a member of an Inter-study Section Group of the U.S. National Institutes of Health. He has been elected President of the Pharmacological Society of Canada and of the Toronto Biochemical and Biophysical Society. Dr. Kalow presented papers at two conferences in New York, (one jointly sponsored by the New York Academy of Medicine and the U.S. National Research Council-N.A.S., and one by the New York Academy of Science).

In addition, members of the Department presented papers at the Federation of American Societies for Experimental Biology, the Canadian Federation, and the International Physiological Congress at Leyden.

Research

Under the direction of Professor E. A. Sellers, Dr. Frances Lettau continued studies of the effects of drugs on body temperature and the modification of drug action in acclimated animals. With Mr. M. Zweig, Mr. K. Pritzker, and Dr. Francisco Eng the relationship of clotting to coronary atherosclerosis was examined. Incidentally it was found that iproniazid caused an increase in blood cholesterol and this phenomenon is being studied further using drugs either related chemically or in pharmacological action to iproniazid. One such drug, nicotinic acid, is used clinically to lower blood cholesterol. Also in Dr. Sellers' section, Dr. W. J. Russell Taylor has continued his studies on the clinical-pharmacological evaluation of various drugs. At the request of the Emergency Health Service (federal) Dr. Taylor, with Dr. E. Llewellyn Thomas, performed an assessment of the side effects of a remedy proposed for use as a prophylactic against organophosphorus poisons.

Professor E. Schönbaum and Dr. Sellers are continuing a study of the goitrogenic effect of thyroid hormones. An explanation of this anomalous effect may throw light on the control of thyroid secretions and the causation of hitherto unexplainable thyroid diseases. This effect has now been observed in goitres produced by chronic treatment with perchlorate. Clearly it is a phenomenon of general significance and not related to the specific effects of propylthiouracil. It would appear that the concept of a "negative feedback" system controlling thyrotrophin release must be extended to include a "positive feedback" phase. Thyrotrophin assays, now in progress, will shed further light on this interesting problem. Professor G. Hetenyi of the Department of Physiology has been of great help in statistical problems related to these assays and we are most grateful to him. During the past year, close collaboration with Drs. McA. Johnston, C. Ezrin, and R. Volpé of the Department of Medicine has been established and very interesting studies on the significance of a long-acting thyroid stimulating factor (LATS) have begun. This material has been suggested as a causal factor in Graves' disease.

The problems related to the interaction of body temperature, environmental temperature, and drugs continue to receive intensive study. During Dr. G. E. Johnson's absence (working with Professor U. S. von Euler in Stockholm on related problems) studies on the mechanism of reserpine hypothermia have continued, primarily along metabolic lines. After his return, Dr. Johnson will continue his catecholamine studies. The extraordinary sensitivity of cold-exposed mice to reserpine was found to be due to their inability to respond with an initial increase of the metabolic rate. Pre-treatment with imipramine abolished this sensitivity to reserpine. Studies on the responses of immuno-sympathectomized rats to various treatments have been started recently.

Professor W. Kalow, in collaboration with Dr. Nancy Simpson, a Queen Elizabeth II Scientist, has tested hereditary variants of human pseudo-cholinesterase and explored means for their characterization. A "silent gene" for esterase appears to be allelic to that giving rise to atypical esterase. Esterase levels were found to be under environmental control. In a co-operative study with Dr. E. D. Wigle in the Cardiovascular Unit of the Toronto General Hospital, esterases were explored in cases of pulmonary hypertension. Mr. D. Ecobichon separated and identified esterases of human muscle and kidney. Dr. P. Sadowski resumed his studies on alkaline phosphatase in hypophosphatasia. Dr. A. Marton continued his studies on the toxicity of organophosphates until he left the Department in December. Dr. J. N. Cummings initiated a study on placental transfer of drugs. Mrs. Vivian Sterne found curious influences of cationic drugs on the binding of tubocurarine to plasma proteins—this study is now intensely pursued by Mr. A. Katz. Other studies in Dr. Kalow's section have shown that neuromuscular endplates are located at the arterial end of capillaries; this may partially account for the rapid action of muscle relaxants. Catecholamines have been tested in material from patients with phenylketonuria and hypoglycaemia. Dr. Simpson has organized a register on behalf of the Canadian Diabetic Association.

In Professor H. Kalant's section, the study of the metabolic actions of alcohol and other addictive drugs has followed several lines. A general metabolic effect of alcohol, which may underline its intoxicant and addictive properties, is the inhibition of active transport of potassium by the cell membranes of various tissues. Mr. Y. Israel has demonstrated the quantitative significance of this phenomenon in frog skin, and is now investigating rabbit kidney and rat brain. Collaborative studies with Dr. G. Sereny of the Addictions Research Foundation have included double-blind clinical evaluations of triiodothyronine, diazepoxide, and promazine in the treatment of withdrawal reactions. In collaboration with Dr. R. K. Murray of the Department of Biochemistry, a study has been completed of the comparative effects of EDTA on the leakage of proteins from slices of normal rat liver and of hepatomas produced by feeding butter yellow. In addition, these tumours have been studied with respect to the amounts, chemical types, and histological local-

ization of neuraminic acid derivatives which they contain. Mr. R. A. Hickie has defined the self-absorption characteristics of Ca^{45} radiation in soft tissues and studied the removal of Ca^{45} from the livers of rats by perfusion with EDTA. This work is now being extended to the tumours mentioned. These studies are contributing to the formulation of a hypothesis concerning the role of calcium in the mutual adhesion of normal cells and the mechanism of metastasis of tumours.

Professor Rosemary D. Hawkins, in collaboration with Dr. Kalant, has investigated the effects of small doses of ethanol on the oxygen consumption of sedated rats. A small but significant increase in oxygen uptake was observed but the mechanism whereby this effect is obtained is as yet unknown. An examination of the effects of the administration of the oral hypoglycaemic agent, tolbutamide, on the DPN/DPNH ratio in the livers of ethanol-treated rats was undertaken. Under the conditions used, this agent caused no further depression in the DPN/DPNH ratio beyond that induced by the ingestion of ethanol alone. A study of the effects of ethanol on the levels of noradrenaline and 5-hydroxytryptamine in the brain stem of rats has been initiated.

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PHYSIOLOGY

Under the direction of Professor C. H. Best

During the 1962–3 session the University of Toronto Physiological Society held five meetings, at which the following papers were presented by scientists from Canada, England, and the United States: Dr. P. N. Campbell, Courtauld Institute of Biochemistry, Middlesex Hospital Medical School, London—"Studies on the biosynthesis of Serum Albumin by Subcellular Components"; Dr. Anima Devi, University of Laval—"Ribonucleic Acid and Protein Synthesis"; Dr. C. P. Fulton, Boston University—"Platelet Behaviour in the Living Microcirculation"; Dr. Irvine H. Page, Cleveland Clinic Foundation—"Nature of Hypertension"; Dr. J. M. R. Beveridge, Queen's University—"Dietary and Metabolic Factors Involved in the Control of Plasma Lipid."

The following scholarly addresses were presented by members of the staff: Professor G. Hetenyi, Jr.: "Effects of Insulin on the Accumulation, Production, and Utilization of Glucose in Dogs," Twenty-Second International Congress of Physiological Sciences, Leyden, Holland. Professor F. C. Monkhouse: "Studies of Plasma Antithrombin and Heparin-Cofactor," Cardeza Foundation, Jefferson Medical College of Philadelphia; and "Recent Advances in Physiology-Coagulation," Department of Physiology, University of Western Ontario, London, Ontario. Professor J. W. Scott: "Muscle Tone," Department of Physiology, University of Buffalo, Buffalo, New York.

Graduate students have completed the following theses for the M.A. degree: Mrs. A. L. Crawford, "Some Effects of Glucagon and Insulin in Normothermic and Hypothermic Rats"; for the Ph.D. degree: D. S. M. Haines, "Studies on the Metabolism of Plasma Lipids in Rats with Reference to the Mechanism of Action of Choline"; J. Kraicer, "Pituitary-Target Organ Interrelationships"; R. J. S. Metz, "Factors Influencing Urea Synthesis."

Research

In Professor R. E. Haist's section Dr. J. K. Davidson has developed a special method for the preparation of insulin solutions from acid alcoholic extracts of pancreas, which provides excellent yields from beef, guinea pig, and rat pancreas. With this procedure, the effects on the insulin content of pancreas of steroid administration in hypophysectomized and intact animals are being studied. Islet volume measurements are being carried out on similarly treated animals by Mr. D. Nickerson and from these combined measurements changes in the insulin concentration per unit of islet tissue can be determined. Mrs. G. Nash has been assisting with the measurement of changes in the dimensions of the small blood vessels of the living islets under a variety of conditions. Dr. M. Henderson and Miss A. Haag have been investigating the effect of altered body temperature on the free glucose of tissues under the influence of insulin and a glucose load. Mrs. A. Crawford is studying the influence of hypothermia on the changes in blood sugar and inorganic phosphorus levels resulting from the administration of glucagon, insulin, orinase, and growth hormone. Mr. M. Kroch and Mrs. M. Evans are measuring the effect of hypothermia on the plasma potassium changes following the injection of certain hormones. Dr. M. A. Ashworth is studying the influence of a number of agents on the rate of fall of body temperature under standard conditions and on heat production at lowered body temperatures.

In Professor J. Campell's section, the mobilization of fat from adipose tissue has been studied with Mr. K. H. Shumak and Mr. G. R. Green. The influences of glandular deficiencies, hypophyseal, adrenal, and thyroid, on the amounts of free fatty acids in adipose tissue and on the rates of release of fatty acids from the tissue *in vitro* were determined. In a study of the excessive mobilization of lipid that occurs

in diabetes, the effects of hypophysectomy and of adrenalectomy in the diabetic animal on the rates of release of adipose tissue *in vitro*, and the responses of the tissue from these animals to glucose, insulin, and corticotrophin, were tested.

The effects of nutritional conditions and of endocrine factors on the levels of insulin in blood plasma and in extracts of the pancreas are being investigated with Dr. K. S. Rastogi and Mrs. V. Lazdins. For this purpose a biological assay for the insulin in pancreatic extracts and an immulogical assay for the insulin in blood serum have been adapted.

A colony of Chinese hamsters has been established in the laboratory, and the genetic factors involved in the occurrence of spontaneous diabetes in these animals are being studied by Dr. H. R. Hausler, Dr. T. M. Sibay, and Miss B. Stachowska, with the co-operation of Dr. L. Butler of the Department of Zoology and of Dr. A. Sirek of this Department. Retinopathy has been found in some of these diabetic animals. By treatment with cortisone and growth hormone, it has been possible to induce diabetes and also retinopathy. The biochemical characteristics of this type of diabetes are being studied. Retinopathy comparable to that found in diabetes in man has been found in a dog with permanent pituitary diabetes of ten years' duration.

In Professor D. W. Clarke's section, studies on the mode of action of oral hypoglycaemic agents have continued, along with investigation of some factors which might modify the action of insulin. The influence of ethanol on ATP levels and on ATP-ase activity in different parts of the rat brain has been studied, and investigations in this field are continuing. Miss L. Geiger is studying some of the metabolic consequences of experimental allergic encephalitis.

In Professor G. Hetenyi's section, quantitative tracer techniques have been used to analyse the response of adrenalectomized and adrenalectomized-diabetic dogs to insulin. Using similar tracer techniques, Dr. N. Forbath is investigating the response of diabetic patients to injected glucose. Mr. S. Mintz demonstrated the existence of the new formation of glucose from amino acids by the isolated rat intestine. Experiments to elucidate the mechanism of the accumulation of free glucose in liver cells after the injection of insulin are being continued.

Professor F. C. Monkhouse, with Mrs. S. Milojevic, has continued work on the purification of plasma antithrombin. An alpha globulin fraction with high antithrombin activity has been isolated from beef plasma. Its physiochemical as well as its biological characteristics are being studied. Dr. D. Hopkins is investigating changes in plasminogen activation during coagulation. In addition he has done a detailed study of the kinetics of one of several normal plasma inhibitors of plasmin. Professor Monkhouse with Dr. R. Gillespie is studying the action of aspergillin O, a fibrinolytic enzyme, on other proteins concerned with coagulation such as prothrombin, fibrinogen, and antithrombin. Studies are also being carried out on the relation between changes in endogenous heparin and changes in Clearing Factor Lipase activity in experimental animals. Miss M. MacNab is studying the role of Clearing Factor Lipase in the transport and metabolism of lipids.

In Professor A. M. Rappaport's section, research is continuing on the effect on hepatic circulation of ammonium salts infused *via* the hepatic artery into the liver. In co-operation with Dr. E. Llewellyn Thomas of the Department of Pharmacology, and Dr. H. B. Fairley and Dr. S. B. Goel of the Department of Anaesthesia, hepatic arterial and portal blood flow are measured with the electromagnetic flow meter before and during infusion of ammonium acetate into the liver. Also a careful study is done of the effects of various tensions of $O_2 + CO_2$ in the blood, of increased intrathoracic pressure, and of phenothiazines on hepatic arterial blood flow.

The microcirculation of the liver of the mouse and rat is being studied, by Dr. Rappaport together with Dr. Black, by transillumination *in vivo*; the circulatory activity of the simple and complex acini has been recorded on a film strip. Dr. Rappaport, using his technique of transplanting either the uncinate process or the (splanchnic) tail of the pancreas and their vessels under the skin, is continuing to study, together with Professor Wrenshall and Dr. M. Vranic, the immediate effects

of temporary or permanent exclusion of the islet tissue from the circulation. The joint research with Dr. R.B. Holmes of the Department of Radiology on hepatic venography has been presented to the Tenth International Congress of Radiology in Montreal. Hepatic venography has recently been carried out in two human cases.

In Professor J. W. Scott's section, five projects have been continued. Dr. R. G. Black has extended his study of the trigeminal nerve in the cat. Drs. R. Nichka and D. J. R. Briant have developed methods of keeping electrodes in the vestibular nerve for prolonged periods. This will permit the study of various portions of the vestibular apparatus. Dr. S. J. Peerless has undertaken a study of nerve transplants to restore function in the paraplegic's bladder. Dr. O. F. Veidlinger, assisted by Mr. R. Hayward, has investigated muscle tone in normal and diseased states, using the equipment previously developed in this section.

Dr. S. Appleby and Mr. P. McDermick, in co-operation with the Department of Otolaryngology, have investigated the use of cortical-induced potentials as an objective test for hearing in the newborn.

In addition, two engineering students from the Institute of Biomedical Electronics have been working in the section; Mr. R. Swirsky made a study of the Servo mechanisms of the stretch reflex, and Mr. W. Riemer is measuring the electrical impedance of various portions of the brain.

Professor O. Sirek, in collaboration with Dr. A. Sirek continued his studies on serum proteins and glycoproteins in newborn children of diabetic women and also in offspring of alloxan diabetic rabbits. One of the significant observations was made by the use of immuno-electrophoresis. It was found that the infants of diabetic women, in comparison to their controls, have a larger number of distinct "arcs" of which that in continuation of the orosomucoid and that in the siderophilin region are most striking.

Professor Sirek spent six months of the academic year at the La Rabida-University of Chicago Institute where he studied, with Professor A. Dorfman, the chemistry of connective tissue.

Dr. W. S. Hartroft, who left the Department ten years ago to become Head of the Department of Pathology, Washington University, St. Louis, has returned to Toronto as Director of the Research Institute of the Hospital for Sick Children. We are extremely pleased to welcome him back as a professor (part time) in our Department. He is continuing with his outstanding researches in the field of liver function. Dr. Phyllis Hartroft, as an assistant professor in the Department, is extending her work on the juxtaglomerular cells.

Professor Walter Johnson is an honorary member of the Department. As an authority on dizziness he has been the Canadian medical scientist who has contributed to the space problems of the United States. Dr. J. Archibald continues to give valuable assistance in his capacity as Honorary Consultant Veterinarian.

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PSYCHIATRY

Under the direction of Professor A. B. Stokes

The concern, over recent years, for mental health services, aligned to the needs of the mentally ill or emotionally disturbed, has raised continuously the problems of applying scientific knowledge to the practice of psychiatry. In so far as psychiatry is a medical discipline the biological sciences have application, for example, chromosomal defects, enzymatic deprivation, hormonal imbalance, the structure of the limbic lobe, peripheral vascular physiology, psychopharmacology, and the like. In so far as psychiatry is a psychosocial discipline the behavioural sciences contribute both to understanding and practice, for example, learning theory, psychodynamics, social structure and interplays, anthropology, and other such studies. But the difficulty of integrating the biological and the behavioural with their different languages, their differing slants—the one to the inner physical environment, the other to the outer personal-social milieu—still remains as a supreme challenge to university departments of psychiatry.

The problem goes deep since medical education traditionally is based on biology, whereas the behavioural sciences in the main are the concern of non-medical disciplines. Where both the biological and the behavioural approaches are necessary, as in psychiatry, medical and non-medical disciplines meet together. In regard to the meeting the old phase of warring sectarianism is over. Now, although complete accord is still far from attained, a degree of mutual understanding has emerged as a consequence of colleagueship in the study of human disability. Mutual understanding is a very considerable gain since it is the beginning of integrative opportunity in practice. Medicine has achieved a high degree of integration where the physical and biological sciences are concerned: many specialties of very different backgrounds

come together in multidisciplinary concert to aid the organically sick person. But the taking over or building in or reaching out to the behavioural sciences is still an infant medical activity, mainly fostered by psychiatry, within the limitations of "slow to change" curricula.

The criticism that much more must be done, and in better fashion, to bring about an appreciation of the psychological and social factors in personal vulnerability and disablement is fully justified. The behavioural sciences represent a resource which should be available to the undergraduate medical student in his educational progress towards the attainment of knowledge and skills equal to the responsibilities of a basic physician: the behavioural scientists are poised in readiness for a fruitful collaboration with medical specialists in a broader approach to the problems of sustained continuing illness. Attention to the conditions favouring the desired contribution and collaboration is necessary. For example, in the undergraduate years the "family doctor to be" might well be exposed to studies of family structure and family interplays. Such studies will require the underpinning of applied psychology and sociology. Again, in the interne years, the personal and social motivations involved in recovery from illness or accident require important representation in the over-all hospital experience —and so on throughout the course of medical preparation for general or specialist practice.

In psychiatry the behavioural sciences are evidently necessary for both theoretical understanding and practical action. It is of momentous consequence that departments of psychiatry are appointing behavioural scientists to their staffs and involving them in the problems of clinical service, teaching, and research. One outcome is slowly emerging, the structuring of pilot projects in which carefully delimited services become the testing grounds for the application of new psychological and sociological knowledge. It is this focussed testing which is the augury of better and more effective mental health services in the future.

Over the academic year, 1962–63, the undergraduate medical courses of instruction have been modified to allow a greater emphasis on human development. Previous revisions have been consolidated so that the student may become aware of scientific advances in the psychological and social fields and the opportunity of their application. The standard of performance in the final examination was good.

Graduate instruction, as offered in the Department, has been under critical review by a small committee which is in the process of making its recommendations. The essential problems receiving critical consideration are: (*a*) the teacher-pupil relationship as it influences professional development; (*b*) the integration of central and peripheral programmes of instruction; and (*c*) the over-all organization of the Department's educational function, from enrolment to the attainment of specialist status. The committee's work is not only to correct defects resulting from rapid departmental growth but also to anticipate future expansion and responsibilities. The number of graduate students in the Department was 79, including overseas fellows and Colombo Plan graduate students. Twenty-seven were successful in the Diploma examination. Of past diplomates seventeen gained the specialist Certificate in Psychiatry of the Royal College.

The graduate course in child psychiatry for third and fourth year students has made progress. Five candidates are enrolled and one has completed the course successfully. Some concern has been expressed that service posts in Metropolitan Toronto are not sufficiently developed to absorb the child psychiatrists who have graduated as specialists.

The mental retardation services of the Toronto Psychiatric Hospital have expanded and have developed an active educational programme. Dr. L. T. Hilliard and Dr. B. W. Richards have held appointments as Visiting Professors in Mental Retardation. Both are distinguished British specialists of international renown and have been supported financially by the Ontario Association for Retarded Children. They have involved many groups of professional workers, medical and non-medical, in the unfolding scene.

Throughout the academic year a number of distinguished psychiatrists have visited from abroad to deliver lectures and conduct seminars, and staff members have been active participants in other University programmes.

In co-operation with the Canadian Broadcasting Corporation, the Department has contributed to the University-sponsored Live and Learn programme. Dr. Lovett Doust organized an interesting series of television presentations, embracing well-known psychiatric syndromes: he himself was a distinguished moderator and was supported by teams of junior and senior staff.

The library facilities have been used extensively and the new additions have been greatly appreciated. Despite the continuing difficulties of space the library is expanding and is now a resource appropriate to a University Department.

The working drawings of the new Psychiatric Institute have been completed and the particular problems associated with the site have been resolved. Tenders will be called for in a matter of weeks and thereafter construction will not long be delayed.

Again it is a pleasure to record a great indebtness to the Provincial Department of Health and particularly to the Minister for his personal interest and support. The Ontario Mental Health Foundation, the McLaughlin Foundation, the Atkinson Charitable Foundation, the Laidlaw Foundation, the Nuffield Foundation, the Medical Alumni Association, the Ontario Association for the Mentally Retarded, and the Medical Research Council have each, in different ways and in respect to differing needs, contributed generously in the funding of the Department's activities. To them, and to a large number of friends and donors in private life, sincere thanks are offered for their fostering activities.

The Department of Psychiatry has grown over the years into a large network of clinical facilities, each with its place in an over-all educational programme. Despite some intrinsic strains, co-operation and integration have been good. The Department's Board of Teachers and its committees have worked hard and constructively, while outside support from the Dean and the Medical Faculty has been always available in most generous measure. The present circumstances of mutual colleagueship offer high hopes for successful endeavour in the new Institute.

Research

Research activities in any university department may be considered from a number of standpoints: indeed those kinds of activities labelled as research are now so various, so overlapping, and so many-faceted as to raise many questions and many problems, whatever the position of appraisal may be. The peculiar prestige attached to researching in a scientific and technological era is a circumstance which has many consequences for research activities, not the least of which is the involvement in public policy and the public expectancy of immediate benefit by the utilization of science.

The Department of Psychiatry has been somewhat implicated in the unfolding patterns of public policy over the past year. As a discipline, psychiatry must use knowledge derived from both the biological and the behavioural sciences: therefore its range of research interest must be extensive. But the more variegated the research programmes the more difficult it is to attract the necessary funds. The building up of research resource, regardless of immediate practical gains, continues to be a primary issue. A focussed curiosity, avidly exercised in the education of a new hypothesis capable of disciplined proof, is still the essential quality of the researcher that requires fostering wherever it may be found. On this background particular departmental studies may be reviewed.

Dr. M. Sloane has continued his anatomical studies of the limbic lobe system. Dr. H. C. Stancer, in the biochemical (neurochemical) division, has initiated studies into the phospholipids of blood and cerebral spinal fluid: he is attempting an assessment of the biochemical role of the central nervous system lipids in mental disease

and mental retardation. The initial stages, which involve the adaptation of recent analytic methods, are being worked out in collaboration with Dr. M. Kates of the National Research Council, Ottawa; Professor Erich Baer has been most helpful in supplying some synthetic standards. Dr. J. W. Lovett Doust has continued to investigate the psychophysiological characteristics of an endogenous rhythm in peripheral circulatory function, perceived as a biological clock. Seemingly, when the clock pacemaker is abnormally slow the conditions favour the production of a schizophrenic type of reaction; when the clock pacemaker is abnormally fast organic brain disease may be subsumed. Methods of monitoring this endogenous rhythm and its reverberations are being developed by the research team (including Mr. R. Gilder and Mr. J. Mourant, Mr. I. Podnieks, and Mr. A. Luft). One such development is concerned with following cerebral microcirculation by rheo-encephalography. An application of this work to the problems of mental retardation has been initiated in co-operation with the Metropolitan Toronto Association for Mentally Retarded Children. Groups of retarded children are under investigation to identify those subjects in which an organic brain syndrome is a factor in the retardation.

In the psychological division Dr. B. Quarrington has continued his study of the oscillation of feeling states in normal subjects. Data collected over 1961–62 are being subjected to the modern techniques of statistical analysis. Computer programmes have been developed for harmonic analysis, reconstruction of hypothetical harmonic curves, successive difference ratio, and computer plotting of serial observation and hypothetical curves. In anticipation of both large-scale studies and intensive individual studies, methods of data collection and analysis are being refined to maximum precision and economy of time. In co-operation with the speech clinic, experimental investigations of stuttering continue.

Dr. S. Neiger with Mr. D. A. Quirk has reported on the Rorschach diagnosis of depression and anxiety states. With Mr. C. Papastergiou, Dr. Neiger has reported on the relationship between depressive personality characteristics and Rorschach card preference. Dr. H. McLeod and Mr. O. White have studied the Kahn test of symbol arrangement in relation to psychotic, neurotic, and character disorders.

The Forensic Service has reported a number of research activities. Dr. H. C. Hutchison with Professor Gray, Dr. M. D. Tuchtie, and Mr. D. Steinberg, has investigated the effect of alcohol on higher mental functions. Dr. Hutchison and Professor Gray have attempted a more precise definition of psychopathic personality by seeking widespread psychiatrist opinion on aetiology and treatability. A study of youthful offenders appearing in the Toronto magistrates courts has been undertaken under the aegis of the Rotary Club of Toronto. Dr. R. E. Turner, with Mrs. M. Jerry, has made an analysis of statutory referrals to the forensic clinic. Dr. J. W. Mohr has continued his studies of sexual offenders, particularly pedophiles, and exhibitionists; in collaboration with Dr. C. K. McKnight of the Ontario Hospital, Penetanguishene, he has also conducted a survey of homicidal cases admitted to hospital as criminally insane.

Dr. D. Cappon and his research team (Dr. R. Banks and Mr. M. Bartoletti) have furthered their research into orientational perception and its measurement in psychiatric patients and normal subjects. No differences between these groups were found when perceptual functioning was rated objectively. On the other hand subjective differences were obtained in the laboratory and were enhanced under experimental conditions of stress. Distortions of temporal experience were particularly investigated, and opportunity was taken with sleep-deprived subjects to study their group functioning. The problem of measuring subject experience is a continuing challenge to the research team.

Dr. D. J. McCulloch at the Ontario Hospital, Toronto, is pursuing his enquiry into the factors affecting change in patients undergoing psychotherapy. A comparison of psychiatric patients and normals on a wide range of developmental and biographic factors has been completed. Dr. S. J. J. Freeman, working with Dr. McCulloch and Miss E. Leavens, has surveyed forty-one married couples presenting

at the Out-Patient Service with marital problems who have been followed up after one to three years.

Other areas of clinical research have been developed in the various services. Dr. E. F. W. Baker, at the Toronto Western Hospital, has studied the therapeutic value of lysergic acid diethyamide in chronic alcoholism. He has followed up the effect of prefrontal lobotomies carried out over a period 1952–60 on intractable psychoneuroses: 85 per cent were found to have a sustained remission. Dr. P. H. Melville, from the Toronto General Hospital, has reported on the relationship between national origin and the symptom pattern of mental disorder; he has continued to study the thyroxin effects on metabolism. Dr. E. J. Rosen of the Children's Division, Toronto Psychiatric Hospital, has completed a study of unmarried mothers under the age of 16. Dr. A. Bonkalo of the in-patient service, Toronto Psychiatric Hospital, has investigated post-ECT confusional states with particular attention to the phenomenology of reorientation, the factors involved and the possible implications for psychotherapy and general management. Dr. H. R. Alderton of the Thistletown Hospital has conducted a control study of the use of imipramine in childhood enuresis. With Dr. Hoddinott he has investigated the reliability and validity of a behaviour rating procedure. Dr. T. Ward with Dr. Hoddinott, has undertaken a long-term research study into childhood schizophrenia and early infantile autism.

These studies, and many other enquiries of less structured kind, are indicative of questing enthusiasm. No dramatic extension of knowledge has been achieved but contributions have been made towards a more firmly developed integrate of experience. Thanks for generous financial support are due to both the federal and provincial governments, to the Ontario Mental Health Foundation, the Medical Research Council, and a large number of private donors who contribute to the Psychiatry Advancement Fund.

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RADIOLOGY

Under the direction of Professor M. R. Hall

There has been no essential change in the undergraduate or postgraduate teaching in the department during the past year. The postgraduate course leading to the diploma in medical radiology continues to attract postgraduate students and it is a pleasure to report that eight candidates have obtained their D.M.R. diplomas this year.

Dr. C. L. Ash addressed the Orillia and District Medical Society on "The Role of the Princess Margaret Hospital in the Treatment of Cancer." Dr. J. H. Gardiner addressed the Canadian Physiotherapy Congress on "Introduction to Cine Radiography" and addressed the Canadian Medical Association on "Cine Angiography in the Evaluation of Lesions of the Heart and Great Vessels." Dr. H. E. Meema addressed the American Geriatric Society on "Measurable Roentgenologic Changes in some Cortical Bones in Senile Osteoporosis."

During the year 1962–63, in addition to routine duties, members of the staff gave lectures and papers to other local groups, as follows.—Dr. W. E. C. Allt: "Available Means of Radiotherapeutic Treatment of Primary Carcinoma of the Lip," Conference on Carcinoma of the Lip, Ontario Cancer Treatment and Research Foundation, Ottawa. Dr. M. Barkin: in conjunction with Drs. W. K. Kerr and W. D. Rider, a paper on "Carcinoma of the Testis," annual meeting, Canadian Urological Association, Ottawa. Dr. F. A. Beale: in conjunction with Dr. K. F. MacEwen, a paper on "Experience with Lymphangiography," annual meeting, Canadian Association of Radiology, Quebec; and a paper on "Therapy of Skin Cancer," annual meeting, Canadian Dermatological Association, Don Mills, Ont.

Dr. W. R. Bruce: in conjunction with Dr. C. L. Ash, a paper on "Survival of Patients Treated for Cancer of the Breast, Cervix, Upper Respiratory Tract and Lung at the Ontario Cancer Institute (Toronto) from 1930 to 1957." Radiological Society of North America, Chicago, Ill. Drs. A. Bruce-Robertson, W. D. Rider, and A. S. McFarlane: "A Study of the Acute Radiation Syndrome in Man," Tenth International Congress of Radiology, Montreal. Dr. D. P. Bryce: in conjunction with Drs. P. E. Ireland and W. D. Rider, a paper on "Experience in the Surgical and Radiological Treatment in 500 Cases of Carcinoma of the Larynx," American Laryngological Society, Hollywood, Fla. Drs. J. R. Cunningham, H. E. Johns, and C. L. Ash: "A Double-Headed Cobalt Unit," Tenth International Congress of Radiology, Montreal. Dr. R. B. Holmes: panelist at the Film Interpretation Symposium, Radiological Society of North America, Chicago; with Drs. A. M. Rappaport (Dept. of Physiology), H. O. Stolberg, and J. L. McIntyre, a paper on "Hepatic Venography," Tenth International Congress of Radiology, Montreal.

Dr. H. E. Meema: "A Method of Determination of Bone Salt Content of Cortical Bone," Tenth International Congress of Radiology, Montreal. Dr. J. D. Munn: panelist at the Radiological Society of the State of New York meeting held in Bermuda. Dr. M. V. Peters: panelist, "Management of the Patient with Advanced Solid Cancer," annual meeting, Canadian Medical Association, Winnipeg; a paper on "Management of the Lymphomas," Park Avenue Hospital, Rochester, N.Y.; on the "Curability of Hodgkin's Disease and Lymphoma," Strong Memorial Hospital, Rochester, N.Y.; on "The Management of Carcinoma of the Breast," Rochester Academy of Medicine, Rochester Roentgen Ray Society, Rochester, N.Y.; on "The Results of Treatment of Early Lymphoma," annual meeting, American Radium Society, San Francisco, Calif. Dr. W. D. Rider: "Carcinoma of the Bronchus," annual meeting, Ontario Thoracic Society, Toronto; "Irradiation Damage to the Brain, a New Syndrome," annual meeting, Canadian Association of Radiologists, Quebec. Dr. W. J. Simpson: "Radio-iron Scans," Tenth International Congress of Radiology, Montreal; "Scanning of Iron 59 and Strontium 85, Using Total Body Scanner," Clinical Radioisotope Scanning Symposium, Oak Ridge Institute of Nuclear Studies, Oak Ridge Tenn.; "Radiostrontium Scans in the Diagnosis of Bone Metastases," Eastern Great Lakes Chapter, Society of Nuclear Medicine, Buffalo, N.Y.; "Current Aspects of Irradiation Therapy and Chemotherapy of Malignant Disease," Medical Society, Barrie, Ont.; "Radioactive Strontium Scans in the Diagnosis of Bone Metastases," annual meeting, Canadian Medical Association, Toronto. Dr. B. J. Reilly: "Craniosynostosis in Rickets," American Roentgen Ray, Washington, D.C.; and "Metaphyseal Dysostosis," Canadian Association of Radiologists, Quebec.

Research

Dr. J. H. Gardiner is studying the temporomandibular joint by cineradiography and is carrying out animal studies to demonstrate artificially produced renal artery lesions associated with hypertension. Dr. R. B. Holmes, Dr. R. F. Colapinto, and Dr. E. L. Lansdown are continuing their studies on "Radiological Aspects of Coronary Artery Disease" (Picker Foundation Grant). Dr. Holmes and Dr. J. L. McIntyre are investigating techniques for the estimation of layer Thickness in tomography. Dr. Holmes and Dr. P. C. Thorfinnson are continuing studies of venous disease of the lower extremity. Dr. E. Kruyff is making an analysis of pneumo-encephalographic studies, carried out according to the Swedish school, to determine the value of the so-called "unsuccessful" encephalogram in the differential diagnosis of tumours of the posterior part of the posterior fossa. He is also studying the roentgen diagnosis of mid-line cysts and the differential diagnosis from dilated cisterns and other lesions in the area of the corpora quadrigemina.

Dr. E. L. Lansdown and Dr. E. Llewellyn-Thomas (Institute of Biomedical

Electronics) are pursuing their studies concerning scanning patterns and eye movements of radiologists during film interpretation. Dr. H. E. Meema is continuing his research into the various aspects of the appearance of bone in a variety of diseases. He is studying post-menopausal and post-castrational osteoporosis with Dr. M. Bunker of the Department of Gynaecology and Dr. A. M. Wiley of the Department of Orthopaedic Surgery. He is taking part in studies of measurement of skin thickness in acromegalics along with some members of the Department of Medicine. Dr. C. A. F. Moes is continuing studies on spondylarthritis, on diastematomyelia in children, and on idiopathic hypertrophy of the intraventricular septum producing subaortic stenosis. Dr. Moes, Dr. C. A. Stephens and Dr. Jean Desjardins (Department of Surgery) are making an investigation of oesophageal mobility following repair of tracheo-esophageal fistula. Dr. B. J. Reilly is studying the clinical and radiological correlation of spondyloepiphyseal dysplasia.

Reported by Professor C. L. Ash

The research activities of the clinical staff of the Ontario Cancer Institute have continued with the support of grants by the Ontario Cancer Treatment and Research Foundation amounting to $84,425, and of $5,000 by the Defense Research Board. Current projects are as follows: physiological changes in the human following irradiation with particular reference to plasma protein alteration; immune mechanism in neoplastic disease; the treatment of choriocarcinoma with particular emphasis on immunolog methods; the nature of inflammatory carcinoma; the use of lymphangiography in the assessment of human disease with particular reference to testicular tumours and lymphomata; an assessment of the nature of accessible carcinomata by changes in P32 activity in the tumour as detected by an external geiger-tube probe; radiosensitivity testing procedures rising cytological methods; a study of the circulating malignant cell in patients with breast and lung cancer; an assessment of the value of local as opposed to local plus adjacent-area irradiation of primary Hodgkin's disease; a comparative study of nitrogen mustard, vinblastine, cyclophosphamide, and irradiation in bronchogenic carcinoma; the development and clinical trials of an improved body scanner; radioactive phosphorous in the treatment of osseous metastases; the use of strontium 85 in the localization of bone metastases not visible radiographically; the statistical assessment of disease patterns, responses to therapy, and survival continues.

Publications

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SURGERY

Under the direction of Professor F. G. Kergin

As mentioned in last year's report, the training programme for surgeons, operated in our teaching hospitals under the direction of this Department, has been successful as measured in terms of giving young men and women an opportunity for sound surgical experience and a high expectation of success in the Fellowship examinations of the Royal College of Surgeons of Canada. At the present time every medical school in Canada is represented in the group in training and there are graduates of a number of schools outside Canada. In order to meet the accreditation requirements of the Royal College, and also to provide these young surgeons with the progressively increasing responsibility and practical experience, which are essential to development as a surgeon who is both skilled and wise, the teaching hospitals have jealously preserved their teaching units. It is in these wards, the modern successors to the public ward for indigent patients, where the resident in surgery has a major responsibility for patient care, under the supervision of the teaching staff. If this centre is to go on supplying our country, and to a degree other countries, with surgical teachers and specialists, this system must be preserved.

The expectation, and indeed it appears to be a certainty, that some form of government-sponsored universal medical insurance will be introduced in Ontario soon has brought this problem into sharp focus. The Departments of Surgery of the teaching hospitals are studying it and attempting to evolve a sound solution. On the one hand the rights and dignity of the insured patient must be preserved; on the other hand the residents must continue to have the opportunity for major patient responsibility as they approach the end of their long training period. A solution which is being examined is the concept of a team organization for each teaching unit, in which the resident would be a member of the team; it would be the responsibility of the head of the service to define the extent of the resident's participation in patient care. It is hoped that patients will be attracted to such a unit by the expectation of exemplary care, and by the provision in our teaching wards of amenities comparable with those found in any hospital in the area.

The impressive building and renovating programmes of our teaching hospitals, which have been a regular feature of this report in recent years, continue. At the Toronto General Hospital the entire surgical wing of the College Street Building, representing the old public wards so familiar to generations of students, has been renovated into modern teaching wards. The transformation is truly remarkable. The new wing of the Hospital for Sick Children on Gerrard Street nears completion and will open in the autumn of 1963. It will provide approximately 190 new beds, a new emergency department with out-patient operating rooms, and laboratory space on a most generous scale for the Research Institute. St. Michael's Hospital is commencing a major addition which will provide research laboratories, cardiovascular investigation facilities, and a cardiovascular surgical unit as well as accommodation for other departments.

The Balfour Lecture was given on Friday, March 22, by Professor Francis D. Moore, Mosely Professor of Surgery of Harvard Medical School and Surgeon-in-Chief of the Peter Bent Brigham Hospital. He gave a superb lecture on "Haemorrhage and Transfusion" which was greatly appreciated by a capacity audience of students, residents, and staff.

Dr. Wallace Duncan of Cleveland, an alumnus of this medical school who, over a period of years, has given exceedingly generous support to the Orthopaedic Division of the Toronto General Hospital, on March 28, participated in the official opening of the renovated orthopaedic teaching ward of that hospital. His visit corresponded with the homecoming meeting of the orthopaedic surgeons who have been trained under Dr. Dewar's direction and included the unveiling of an excellent portrait of Dr. Duncan in the seminar room of the ward.

The Rochester Surgical Society, of Rochester, New York, visited the Toronto General Hospital and the Hospital for Sick Children on November 2 and 3. Operative clinics were held and programmes of scientific papers given in both hospitals. In November the Interurban Orthopaedic Club, the membership of which includes many of the senior orthopaedic surgeons of the medical schools of the United States and Canada, visited Toronto. A programme of both clinical and research topics was provided by the staff and fellows of the Orthopaedic Division of the Department. A sectional meeting of the American College of Surgeons was held in Toronto in April. A large proportion of the programme was contributed by members of this Department.

During the year there have been many distinguished visitors to the Department. In February Professor Edgar A. Kahn, Head of the Division of Neurosurgery of the University Hospital, Ann Arbor, spent a week with us as Visiting Professor of Neurosurgery. There were shorter visits by Professor Clarence Crafoord of Stockholm, Professor Charles Dubost of the Cardiovascular Hospital, Paris, Mr. A. C. McEachern of Adelaide, Australia, and many others.

Dr. C. Martin Spooner, who for many years served the Toronto Western Hospital as Head of the Division of Urology, retires from the active staff of that hospital and the Department at the end of this year to become a Graduate Lecturer in the Department and Consultant to the hospital. Under his direction a strong division has developed, active in both clinical and experimental investigation.

There have been two additions to the Staff of the Department of Surgery at the Hospital for Sick Children during the year. Dr. Barry Shandling, formerly of the University of Cape Town, has joined the Division of General Surgery, and Dr. Donald Gibson the Division of Orthopaedic Surgery. Dr. E. B. Fish, formerly of the Staff of the Christian Medical College, Ludhiana, India, has been appointed to the Department of Surgery of the Women's College Hospital.

In recognition of the pioneer work on the physiology of hibernation which has been accomplished by the research team directed by Dr. W. G. Bigelow, an invitation was received to make a report at the Second World Conference on Mammalian Hibernation at Helsinki, Finland. Papers were presented by Dr. B. S. Goldman and Dr. E. Schönbaum.

Dr. J. Schatzker, a member of the graduate training course in surgery, was awarded the Medal in Surgery of the Royal College of Physicians and Surgeons of Canada for his essay on "An Experimental Investigation of the Normal Blood Supply to the Proximal End of the Femur of a New Born Pig." This was based on experimental work carried out under the direction of Dr. R. B. Salter at the Hospital for Sick Children.

The Head of the Department was the Royal College Lecturer in Surgery at the regional meeting of the College at St. John's, Newfoundland, during October.

Research

Cardiovascular Surgery

Dr. R. J. Baird, assisted by Dr. R. J. Miyagishima, has continued his study of the effects of intra-arterial oxygen therapy both in the laboratory and on the wards. He concludes that the gas emboli produce their effect partly by stimulation of the beta receptors of Ahlquist and partly by mechanical dilatation of arterioles. Clinically, this form of therapy is useful for rest pain and claudication but not for ischaemic ulcers or incipient gangrene. He has completed a review of all patients at the Toronto General Hospital operated upon for bleeding oesophageal varices and all patients treated for embolism of the arteries of the arm. He has deferred further experimental work on venous autografts awaiting delivery of a mechanical stapler.

Dr. W. G. Bigelow has directed Dr. N. T. McPhail in a continuation of his experimental study of the protective action of various alcohols against the effects

of deep hypothermia. With the help of Dr. Ward Smith of the Provincial Department of Health, the clinical significance of these observations is being explored. Work continues on the homologous transplantation of brown fat from the groundhog and with cross circulation experiments between hibernating and non-hibernating animals.

Dr. R. O. Heimbecker, with the help of Dr. H. Sagawa, has been engaged in a variety of experimental studies. They have had a high rate of success in the experimental animal in replacing sections of the aorta by a highly porous Teflon graft in a two-stage procedure in which the graft is previously prepared by implantation into the abdominal wall. They have continued the work on the function of the dog's heart in which an infarct has been induced and excised. The results are encouraging and may have some application to a proportion of human patients suffering from acute coronary occlusion. By the use of a pulse duplicator they have made, and recorded by coloured movies, a study of the precise function of heart valves, normal, diseased, and surgically treated. A variation of the film type disposable oxygenator is being developed.

Dr. J. A. Key is conducting a clinical appraisal of the long-term results of portocaval shunts for bleeding oesophageal varices.

Dr. H. F. Robertson has investigated the effect of an hyperbaric oxygen environment on the survival of experimental animals subjected to coronary ligation as compared to controls treated in air at atmospheric pressure. This work continues.

At the Hospital for Sick Children Dr. W. T. Mustard and Dr. G. A. Trusler have carried out an active programme of research, assisted by Dr. R. B. Stitt. Dr. Mustard has attempted to produce fibroelastosis in puppies by destroying the lymphatic drainage of the heart. Pulmonary stenosis of a reversible type has been produced in experimental animals to elucidate the exact cause of the electrocardiograph changes found in this condition. Experiments are proceeding in an attempt to evolve a satisfactory operation for transposition of the great vessels; the results offer some encouragement. With Dr. Trusler developmental work on a new type of oxygenator for use with infants has continued.

Dr. Trusler has investigated the use of THAM and assisted circulation in counteracting the metabolic acidosis associated with acute heart failure or severe cyanotic heart disease in infants. With the help of Dr. M. Srouji he is following the excretion of VMA by children operated upon for coarctation of the aorta and relating this to postoperative progress.

At St. Michael's Hospital Dr. W. Sapirstein, by experimental methods, has developed a technique for total or partial cardiac bypass, retaining lung function, and so obviating the need for an artifical oxygenator during operations on either side of the heart. The method has been successfully applied clinically. A two-year follow-up is being done to assess results in patients treated for femoro-popliteal arterial occlusions by thrombo-endarterectomy.

At the Toronto Western Hospital Dr. D. R. Wilson, with the assistance of Dr. C. E. Bayliss, has conducted haemodynamic studies during extracorporeal circulation to investigate the problem of blood sequestration, and also is assessing screening tests to reveal hypertension secondary to renal artery lesions.

General Surgery

Dr. N. C. Delarue has been assisted during the year by Dr. D. F. O'Brien in a continued investigation of many aspects of cancer biology. The blood samples of a series of 263 patients who had been studied for circulating tumour cells are being re-assessed by Dr. D. W. Thompson of the Department of Pathology using a "blind" technique in an attempt to determine the incidence of false positives and reduce these to a minimum. In collaboration with Dr. P. Conen of the Department of Pathology of the Hospital for Sick Children, the study of chromosome variations in malignant cells has been continued and several reports have been made on this work. In collaboration with the Division of Pathology of the Department of Laboratories

of the Toronto General Hospital, a screening examination of sputum for malignant cells in male smokers over 40 years of age has been initiated involving out-patients and in-patients of the hospital. The other studies reported last year are being continued.

Dr. N. T. McPhedran and Dr. R. D. Henderson, in collaboration with Dr. H. Bett of the Connaught Medical Research Laboratory and Dr. C. Ezrin of the Department of Medicine, have attempted to identify a gastric secretagogue in the normal pancreas, so far without success. In the Clinical Investigation Unit of the Toronto General Hospital studies are being made of patients suffering from acute pancreatitis.

Dr. J. E. Mullens, in collaboration with Dr. A. McKay of the Ontario Veterinary College, has continued his work on experimental enteritis in dogs with reference to the effects of repeated exposure to *E. coli* endotoxin.

Dr. J. A. Palmer, in association with Dr. E. R. Yendt of the Department of Medicine, has completed a review of 45 patients suffering from hyperparathyroidism who were investigated and treated surgically at the Toronto General Hospital.

Dr. F. G. Pearson has found that attempts to replace long circumferential defects of the trachea in the dog by intercostal muscle grafts invariably end in failure and is now investigating the use of heavy Marlex mesh for this purpose. This has been reported to be satisfactory for this purpose by other investigators.

Neurosurgery

Dr. W. M. Lougheed has directed Dr. G. Khodadad in a study of repair and anastamosis of small vessels by a variety of techniques including the use of glue and of ultra-fine suture material. Dr. T. P. Morley, in collaboration with Professor J. Olszewski and Dr. C. Tator, has pursued an investigation of the factors involved in the uptake of I^{131} by intracranial tumours. Dr. J. W. Scott has directed Dr. S. J. Peerless in an attempt to re-innervate the perineum of experimental animals by the transplantation of intercostal nerves, and a clinical study of bladder function in chronic paraplegic patients. Dr. R. R. Tasker continues his experimental and clinical study of Parkinson-like states.

Orthopaedic Surgery

Dr. J. G. Evans at St. Michael's Hospital is engaged in several clinical studies: conservative methods of treating fractures of the clavicle, the effect of epidural hydrocortisone in certain types of painful back, and the mortality associated with fractures of the neck of the femur.

Dr. J. E. Hall at the Hospital for Sick Children is carrying out an experimental study of the relative strength of epiphyseal plates and ligaments, a clinical study of the value of Harrington-type rods in the management of scoliosis and of the aetiology and treatment of spondylolisthesis.

Dr. W. R. Harris has continued his experimental study of the physiology of bone growth. With Dr. R. H. Yabsley he has made further observations of epiphyseal homografts, which function for about 4 weeks and then undergo necrosis. Various methods of stimulating epiphyseal growth are under investigation as well as methods to measure growth quantitatively.

Dr. D. L. MacIntosh, in his capacity as Consulting Orthopaedic Surgeon to the University Health Service, has had an unusual opportunity to see and treat a large number of severe knee injuries in young athletes and is conducting a careful follow-up study of the results obtained.

Dr. G. F. Pennal has now completed a review of the results obtained in 250 patients subjected to spinal fusion. The mechanical factors in stability or instability of the lumbosacral joints are being studied in human cadavers, using a stress machine, with a view to improving methods of fixation of these joints.

At the Hospital for Sick Children, Dr. R. B. Salter has continued and extended the studies reported last year and has been assisted by Dr. J. P. Kostuik. The pre-

liminary observations on dysplasia of the hip joint produced experimentally in young pigs have been confirmed, as have the results of selective obliteration of the blood supply to the head of the femur in producing a condition resembling Legg-Perthes disease. As an extension of his previous observations on the effects on articular cartilage of sustained pressure, Dr. Salter has demonstrated that abduction of the hip joint, as carried out in the conservative treatment of congenital dislocation, when associated with adductor contracture produces destructive pressure on the joint surface. This observation is being applied to the treatment of patients. With the assistance of Dr. J. Wardill, a retrospective study of 400 patients who, over a period of 10 years, have been treated at the Hospital for Sick Children for injuries of the epiphyseal plate is being carried out with a view to improving treatment and establishing a basis for prognosis.

Dr. E. H. Simmons, assisted by a series of residents in orthopaedic surgery at the Toronto East General and Orthopaedic Hospital, has completed reports on several clinical studies: a critical analysis of the effects of fractures and dislocations involving the elbow joint, a follow-up of the results obtained by using dermis for arthroplasty, a continuing study of the development of late complications involving bones and joints in patients who have suffered from caisson disease. Several other clinical studies are in progress.

Dr. A. M. Wiley, in the laboratories of the Toronto Western Hospital, has attempted to discover whether alterations of the hormone balance, induced surgically, will modify the development of experimentally produced osteo-arthritis in the dog.

Plastic Surgery

At the Hospital for Sick Children, Dr. W. K. Lindsay has continued his studies of soft tissue and tendon healing in association with Professor Sylvia Bensley of the Department of Anatomy, and during the year has been assisted by Dr. A. Freiberg. The origin and fate of the fibroblast has been investigated using radioactive thymidine and of collagen using radioactive glycine. At the same hospital Dr. H. G. Thomson is attempting to evolve a better technique for masking port-wine stains in children by experimental tattooing of newborn pigs. He is also conducting a series of clinical studies.

Urology

At the Toronto Western Hospital Dr. P. O. Crassweller's investigation of urinary gonadotropins in men, which has been carried on with Dr. A. F. Dyer of the Connaught Laboratories, is nearing completion. They have been unable to obtain positive A-Z tests from the urine of either normal young men or men suffering from acute traumatic or inflammatory testicular disease. Dr. Crassweller, supported by a grant from the Medical Research Council, has initiated a study of renal factors related to recurrent stone formation.

At the Hospital for Sick Children Dr. R. D. Jeffs, assisted by Dr. W. F. R. Harvey, has been successful in developing a method for causing non-obstructive pyelonephritis in the dog and will use this as a model against which to test the efficacy of various therapeutic agents and methods. Several clinical studies are also under way.

At the Banting Institute Dr. W. K. Kerr has directed Dr. M. Barkin, over a period of two years, in a very productive series of experimental studies. An isolated perfused kidney preparation was developed which can be maintained over a period of hours in a physiologically active state. It was demonstrated that such a kidney modifies tryptophan to its carcinogenic metabolites and responds to parathormone by increasing phosphate excretion. Using this preparation it was demonstrated that if hypovolaemic shock is induced, renal vasoconstriction is maintained by intrinsic factors, despite perfusion by normal blood at normal pressure. A study of patients suffering from bladder or kidney tumours indicated that the level of urinary beta-glucuronidase is related to the presence or absence of tumour, being increased in the presence of tumour, falling to normal if the tumour is removed completely, and

again increasing if tumour recurs. Advantage was taken of the opportunity to study the transport of water and electrolytes across the bladder wall in a human patient with an isolated urinary bladder. Dr. Kerr has also been associated with Dr. G. L. Gale, of the Staff of the Toronto Hospital at Weston, in a review of 943 patients who had been treated for genito-urinary tuberculosis with respect to the development of strictures of the urinary tract. With Dr. W. D. Rider, of the Staff of the Princess Margaret Hospital, and Dr. M. Barkin, he has reviewed 384 cases of testicular tumour, and with Dr. A. Keresteci and the help of Professor P. H. Greey of the Department of Bacteriology, Dr. Kerr has carried out a study at the Toronto General Hospital of the factors influencing the development of urinary tract infection in patients requiring an in-dwelling catheter.

Dr. J. L. T. Russell has invented a new ileostomy appliance which is in commercial production and has reviewed 115 patients with substitute bladders.

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THERAPEUTICS

Under the direction of Professor R. W. Gunton

Undergraduate Teaching

The lecture course in Therapeutics in the third medical year was given by various members of the Department of Medicine. The theatre clinics were given by Drs. C. C. Gray and W. T. W. Clarke in the first two terms. Dr. R. W. Gunton was appointed Head of the Department effective January 1, 1963, and shared the teaching duties in the third and fourth terms with Drs. Ogryzlo, Berris, and others. The students achieved high standings in the written examination in Therapeutics. It is a matter for consideration whether this reflected a high level of knowledge of this class or leniency on the part of the examiners. One would prefer to accept the first explanation but some opportunity for judgment may be provided by the class performance in fourth year.

The theatre clinics are considered one of the most important teaching and learning opportunities available to the third year. Custom and tradition in this medical school have impressed on the students the importance of their weekly assignments taken from the case presentations at the theatre clinics. These are marked with great care, a fact known to the students and to which they respond

in general by a serious effort. Encouragement of active learning is generally regarded as the most effective form of teaching. This has been stressed in the Therapeutics course over the years and must be continued.

The clinical-pharmacological conferences in the fourth year are not effective, despite apparent theoretical advantages—small group, student participation, clinical and pre-clinical staff supervision. This may derive from the very feature which is alleged to be their virtue, the presence of two instructors from different disciplines. One or other may be reluctant to be completely frank or expressive, to take charge, to express his strong convictions and personality. All of these artifices of temperament and technique are important in communication of knowledge. The conduct and format of these conferences will be discussed with the Department of Pharmacology and some revisions proposed.

Research

Dr. Mary Robertson investigated the drug 7-2-hydroxy-3-(N-2-hydroxy-ethyl-N-methylamino)-propyl-l, 3-dimethylxanthine-pyridine-3-carboxylate) (Complamin) which had been advocated for the treatment of peripheral vascular disease. It was said to cause vasodilation and also to increase cardiac output and coronary blood flow without increase in heart rate. If this were true, it would have therapeutic possibilities for conditions other than peripheral vascular disease. In co-operation with the Division of Cardiovascular Surgery, Dr. Robertson recorded the effect of Complamin on the cardiac output of 10 open-chest anaesthetized dogs with an electromagnetic flow meter. There was an unimportant increase of 10–15 per cent in cardiac output. This could be reproduced by using a dose of theophylline equivalent to that contained in the Complamin molecule which combines nicotinic acid and a xanthine. The results of this pilot study, in a limited set of experimental circumstances, did not suggest there would be important therapeutic advantages to be expected from Complamin's cardiotonic properties.

Dr. Robertson also conducted some clinical trials of the diuretic 2, 4, 7-triamino-6-phenylpteridine (SKF 8542) (Triamterene) to assess efficacy and the rise in blood urea nitrogen reported by others and observed in a few of our balance study cases last year.

Drs. Gunton and Evans' project on demonstration of myocardial infarction by photoscans of the thorax following intravenous injection of I_{131} tagged oleic acid albumin has been reported to the Department of Medicine.

Dr. Russell Taylor of the Department of Pharmacology and Therapeutics has commenced his clinical investigation of the value of respiratory stimulants in the treatment of chronic respiratory insufficiency. This is supported by a grant from the National Institutes of Health in the United States.

Future Research

It is proposed that a programme of therapeutic evaluation of new and old pharmaceutical agents be undertaken in co-operation with members of the staffs of the Department of Medicine and teaching hospitals in Toronto. An application for financial support has been submitted to the Department of National Health and Welfare and preliminary conversations have been held with the Medical Division of the Canadian Pharmaceutical Manufacturers' Association.

THE DIRECTOR OF THE BANTING AND BEST DEPARTMENT OF MEDICAL RESEARCH

Professor C. C. Lucas and Dr. J. H. Ridout have continued studying the relationship between the kind and amount of dietary protein and the development of hepatic lesions in rats consuming alcohol. Approximately half of the rats were

given 15 per cent v/v alcohol (a concentration that does not produce intoxication) in place of drinking water and the total amount consumed per week was recorded. Other groups of rats on the same diets have been tube-fed with stronger alcohol in sufficient concentrations (30 and 40 per cent v/v) to cause profound intoxication for some hours. The total weekly alcohol intake of the intoxicated and non-intoxicated groups of rats has been kept equal. These experiments to compare the effects of the same intake of alcohol when consumed so as to cause intoxication, or more slowly with no intoxication, are continuing.

Dr. B. Rosenfeld and Miss J. M. Lang have studied the time course of hepatic lipid changes in the rat following the intake of both complete and choline deficient diets. Phospholipid formation in the cytoplasmic fraction associated with microsomes and mitochondria was depressed 8 hours after offering a diet low in choline at a time when there was no increase in the triglycerides of the particulate fat. This new finding will be of value in delineating the sequence of events within the liver leading to the accumulation of triglyceride due to lack of dietary choline.

Studies on the mechanism of lipotropic action of choline have been continued by Dr. S. Mookerjea. Using isolated livers from rats after 5 to 21 days of choline deficiency, no addition of triglyceride to the perfusate was observed. Further studies showed a nearly normal contribution of triglyceride to the perfusate by the livers obtained after either 2 days or more than 21 days of choline deficiency. It is of interest to note that the impairment of triglyceride production by perfused livers of 5 to 21 days choline deficiency is concurrent with the rapid phase of accumulation of hepatic lipid in choline deficient rats.

Dr. N. Morley has developed a chromatographic separation and assay of triglyceride and cholesterol in very small amounts of blood. She is developing as well the double-antibody immuno assay method for insulin in blood.

In Professor G. A. Wrenshall's section it has been found that an abrupt and marked fall in the rate of glucose utilization is the principal factor responsible for the initial accumulation of glucose following total pancreatectomy in the fasting dog. This finding supports that made earlier in this section on the action of injected insulin. The magnitudes of the rates of glucose production, accumulation, disappearance, utilization and excretion also have been determined in the same dogs throughout the period of survival following pancreatectomy. Mr. S. Ilk is making progress in developing a tracer method for determining rates of blood flow through, as well as rates of glucose production and utilization within the hind legs of the dog *in vivo*.

With the assistance of Miss A. McGregor, Miss M. M. Shaw and Mr. J. Skublics, Professor W. R. Franks has continued his work in cancer research. By temporarily changing a host into a hybrid animal it is possible to produce a chimera in which the host's tumour, recurrent following surgical failure, is so foreign that it can be cured by, for example, X-ray. Restoration of the cured host to its former internally-compatible state remains a problem as the graft-hybrid usually dies with secondary disease associated with intestinal and liver damage, and terminal pneumonitis. Attempts are currently being made to substitute for such vulnerable host tissues, donor tissues which are compatible with the donor lymphoid system immunologically dominant in the hybrid. A method of harvesting mitotically active intestinal mucosal cells from the donor has been developed but successful methods of grafting into the mucosal crypts of the host remain to be worked out. Harvesting of lung epithelium requires that the cells be freed from the enmeshing basement membrane.

With Mr. C. S. Lennox a study of the effect on post-mortem carbohydrate changes in brain and other tissue from the inspiration of oxygen at atmospheric and higher pressures is being carried on.

With Mr. G. A. Meek studies were continued on the exposure of animals to high energy noise.

In Professor J. M. Salter's section Dr. C. K. Gorman and Dr. J. Penhos with the assistance of Miss E. Montgomery have concluded investigations which have

shown that glucagon increases free fatty acid utilization and decreases lipogenesis in isolated perfused livers. The data from these experiments also indicate that the change in fat metabolism is due to an inhibitory effect of glucagon on hepatic glycolysis and a subsequent decrease in the production of the acetate needed for the synthesis of fats. Studies performed by Miss S. Ruedy with the assistance of Mrs. C. Hooper have revealed that amino acid catabolism is greatly reduced in rats bearing the Walker carcinosarcoma. The data strongly suggest that the suppression of urea synthesis is due to an increase in the utilization of amino acids for the formation of albumin and also to a decrease in the net synthesis of the ornithine required for the operation of the Krebs' urea cycle. The results of studies performed by Miss D. Harris have produced convincing evidence that an unidentified substance in the globulin fraction of blood plasma greatly increases the ability of rat liver slices *in vitro* to utilize the amino acids contained in the incubation medium.

In Professor J. Logothetopoulos' section studies on the factors controlling insulin release and on the cytochemistry of the islet cells have been continued. In collaboration with Dr. J. Kraicer autoradiographic techniques have been applied to the study of pituitary cytology. The role of zinc in the accessory sex glands was studied with Dr. E. Bell. A separate laboratory for Electron Microscopy has been set up with grants from the Atkinson Foundation and from the Connaught Medical Research Laboratories. In collaboration with Miss P. McKeag electron miscroscopical studies have been carried out on the cells of the pancreatic islets.

Dr. A. Sirek in collaboration with Dr. K. Schoeffling from the University of Frankfurt/am Main, Germany (who spent six months in the Department as a Lilly Fellow) continued her studies on the persistence of insulin-like activity in sera of hypophysectomized and Houssay dogs as measured by the epididymal fat pad assay. Hypophysectomy decreased serum insulin-like activity by some 40 per cent. Subsequent pancreatectomy resulted in no further decrease over a period of observation of 5 weeks.

In Professor D. G. Baker's section with the assistance of Mrs. D. Coles and Miss S. Christie the study of radiation injury has been extended to include both early and late effects. A study of radiation sensitivity and recovery in various segments of the gastrointestinal tract has been continued in collaboration with Dr. R. Mitchell (Dept. of Surgery, Wellesley Hospital). In collaboration with Dr. A. Carsten (Brookhaven National Laboratories, U.S.A.) the effects of irradiation on the components of plasma proteins have been studied. Mr. F. Valeroite has undertaken an investigation of the influence of thermal and beta radiation burns on the early responses of whole-body X-irradiation.

Dr. W. J. Linghorne is continuing his studies in the physiology of bone. The problems at present under investigation are the nature of the osteogenic process; the conditions under which osteoblasts, osteoclasts and chondroblasts differentiate; and the conditions that must be provided for an osteogenic rather than a fibrous repair.

The end of this year marks a change in the appointment of comptroller of this department. Mr. C. R. Cowan is returning to full-time research activities in the field of heparin and thrombosis. His administrative duties which have won him widespread appreciation throughout the medical faculty will be assumed by his very competent associate Mr. K. R. Bowler.

In the Sub-Department of Synthetic Chemistry, the synthesis of several new types of phospholipids was undertaken by Professor E. Baer and his colleagues, Professor D. Buchnea (propylene glycol-containing phospholipids), Drs. G. V. Rao (phosphatidyl-2-amino-2-methylpropanols), N. Stanacev (ether-analogues of lecithins, phosphonolipids), J. Blackwell (phosphatidyl-L-2-amino-1-propanols), and P. Cooper (phosphoryl-β-homocholine, phosphatidyl-β-homocholines). New and shorter procedures for the synthesis of lecithins (H. Pohland) and cephalins (Y. Suzuki) were developed. The members of the staff were ably assisted by Mr. H. Flehmig.

Professor B. S. Leibel's extensive clinical knowledge of diabetes has been of great help to the department in his co-operation with several of the groups who are studying related problems in animals.

C. H. Best

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